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ANALYSIS OF INFORMATION SERVICES/ TERMINAL PACKAGING OPPORTUNITIES

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COVER AND BINDING BY 3M BRAND BINDING SYSTEMS

ANALYSIS OF INFORMATION SERVICES/ TERMINAL PACKAGING OPPORTUNITIES

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ANALYSIS OF INFORMATION SERVICES/ TERMINAL PACKAGING OPPORTUNITIES

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I. INTRODUCTION

INPUT

I. INTRODUCTION

- STUDY TITLE: ANALYSIS OF INFORMATION SERVICES/TERMINAL PACKAGING OPPORTUNITIES

- SCOPE: Interviews were conducted by INPUT and MCAUTO using three different questionnaires for Users, Terminal Manufacturers, and Information Services Vendors, as follows:

	INPUT	MCAUTO	TOTAL
– Users	70	36	106
– Terminal Manufacturers	10	–	10
– Information Services Vendors	10	–	10
– Leasing Company	1	–	1
– Third Party Maintenance	1	–	1
	92	36	128

- All but 3 of MCAUTO's interviews were received prior to this report.

- TIMING: The project was begun on October 18, 1976 with this final report being completed November 22.
  - A mid-term telephone conference was held on November 4. At that time, INPUT's results to date were discussed, and some questionnaire modifications were made. MCAUTO decided to rearrange the questions for their interviews in order to be more appropriate to their vendor-client relationship with their interviewees.
  - It was agreed that where competitors (Information Services Vendors) requested confidentiality, their data would be included in a statistical presentation, without divulging individual names or information.
- A formal presentation of results and recommendations will be made by INPUT in St. Louis on Friday, December 3, 1976.

II. MANAGEMENT SUMMARY AND RECOMMENDATIONS

MANAGEMENT SUMMARY AND RECOMMENDATIONS

SUMMARY

- Establishing a business in packaged terminal/services will require step-by step planning in order to be successfully exploited. A selective market appears to exist in the distribution industry--primarily wholesale. Recommendations follow in the next section.

- Of the 76 respondents who indicated a level of interest, 16 had a MODERATE or VERY HIGH interest in the packaged service. The rest expressed LOW INTEREST, or NONE. This represents an "interest level" of 20% from users cautious about the practicability of such a product.

    - Of the 5 VERY HIGH interest:
        - 3 used in-house EDP exclusively
        - 1 uses both in-house and outside services
        - 1 uses only outside services
    - Of the 12 (one interview was conducted with 2 different departments of Manufacturers Hanover Trust) expressing MODERATE interest:
        - 4 use in-house EDP exclusively
        - 4 use both in-house and outside services
        - 4 use only outside services

- It appears that present non-users of outside services may be as good an opportunity as present users.
- The active interest groups primarily include wholesale distribution and financial/economic data base users.

- Reasons given by those with little or no interest in a packaged service include:
    - Commitment to in-house EDP.
    - Desire to maintain flexibility in selection of a terminal and a computer services vendor.
    - Concern over the willingness and ability of a computer services vendor to provide adequate equipment maintenance.
    - Fear of being locked into a packaged vendor who may then provide inadequate service, and for whom there is no direct, easy replacement.

- No technological breakthroughs are expected in terminal design and manufacture. The process will be evolutionary, leading to smaller (perhaps portable) terminals, with increased intelligence, and greater printing and graphics capability. It is expected that mini/microcomputers will at least augment, and eventually replace, the computer terminal.

- IBM is expected to be in the terminal business primarily as a means of protecting its large computer rental base. They will maintain their pricing structure, which will continue to provide an umbrella for independents.

- IBM is expected to return to the services business after the consent decree expires (1978). Their position, however, is expected to be one of linking their smaller computers--System 32 and the newly-announced Peachtree mini--into a distributed computing network.

- IBM maintenance is considered one of their great assets. The inadequacy of smaller maintenance independents has been a problem for many users. Larger, national firms, such as TRW and Raytheon are actively pursuing third party maintenance in addition to their terminal activities.

- Users are unhappy about the short payout period for leases of terminals from computer services vendors. They would like to see 5 year payouts, instead of the 2 or 3 years they claim are now required.
    - Considering the average turnover period for terminals of 3-4 years, this can be a risky, but opportunistic, possibility for a large financially capable firm such as McDonnell Douglas.

- There is a movement among terminal manufacturers and services vendors toward the use of MBAs as salesmen, particularily those with an industry specialization.
    - One result is a shift toward higher base salaries and lower commission schedules to attract such people.

RECOMMENDATIONS

- INPUT recommends that McDonnell Douglas examine three possible scenarios prior to making a decision on offering a packaged service. The scenarios, sketched in Exhibit II-1 are based upon the major questions:
  - Should McDonnell Douglas make, manufacture terminals, or buy them on an OEM basis?
  - Should McDonnell Douglas offer terminals
    - as an independent terminal supplier
    - in conjunction with existing services
    - as a fixed prepackaged approach?

SCENARIO I - STAND ALONE TERMINAL BUSINESS

- This option is to be considered as a separate decision from that of deciding whether or not to offer a packaged service. It will, however, influence how the packaged service should be pursued.

- There are currently over 100 terminal suppliers, including independent manufacturers of general purpose terminals (Sycor, Teletype Corporation), manufacturers of special purpose terminals (Singer-POS), and computer mainframe manufacturers (IBM, Burroughs).
  - IBM has about 50% of the total installed base.

- If McDonnell Douglas elects to enter this business, it should be separate from MCAUTO and should be expected to exist profitably in its own right. Terminals could, of course, be provided to MCAUTO as one of the options they provide their users.

EXHIBIT ~~III-1~~ II-1

TERMINAL/SERVICE OPTIONS

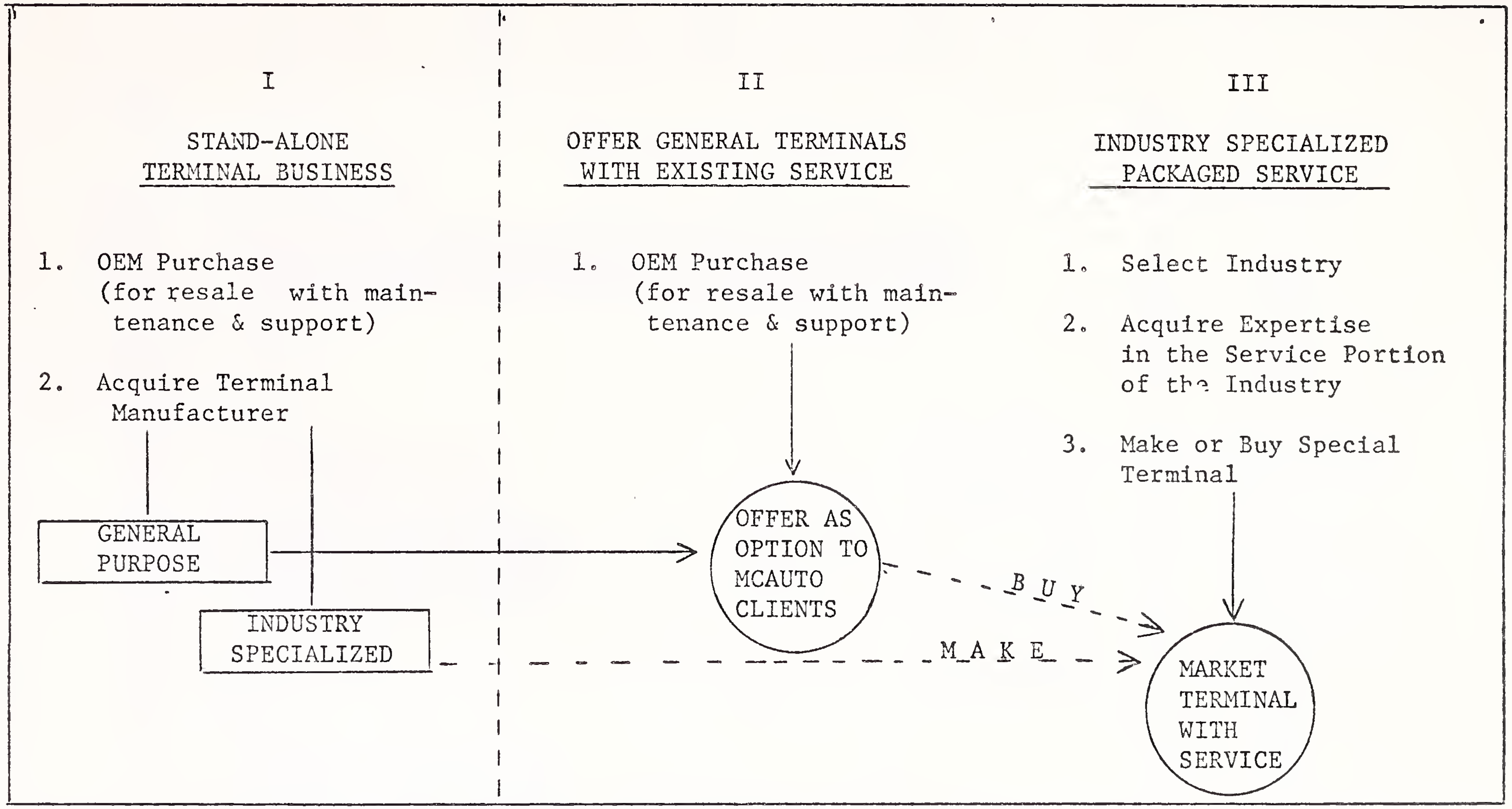
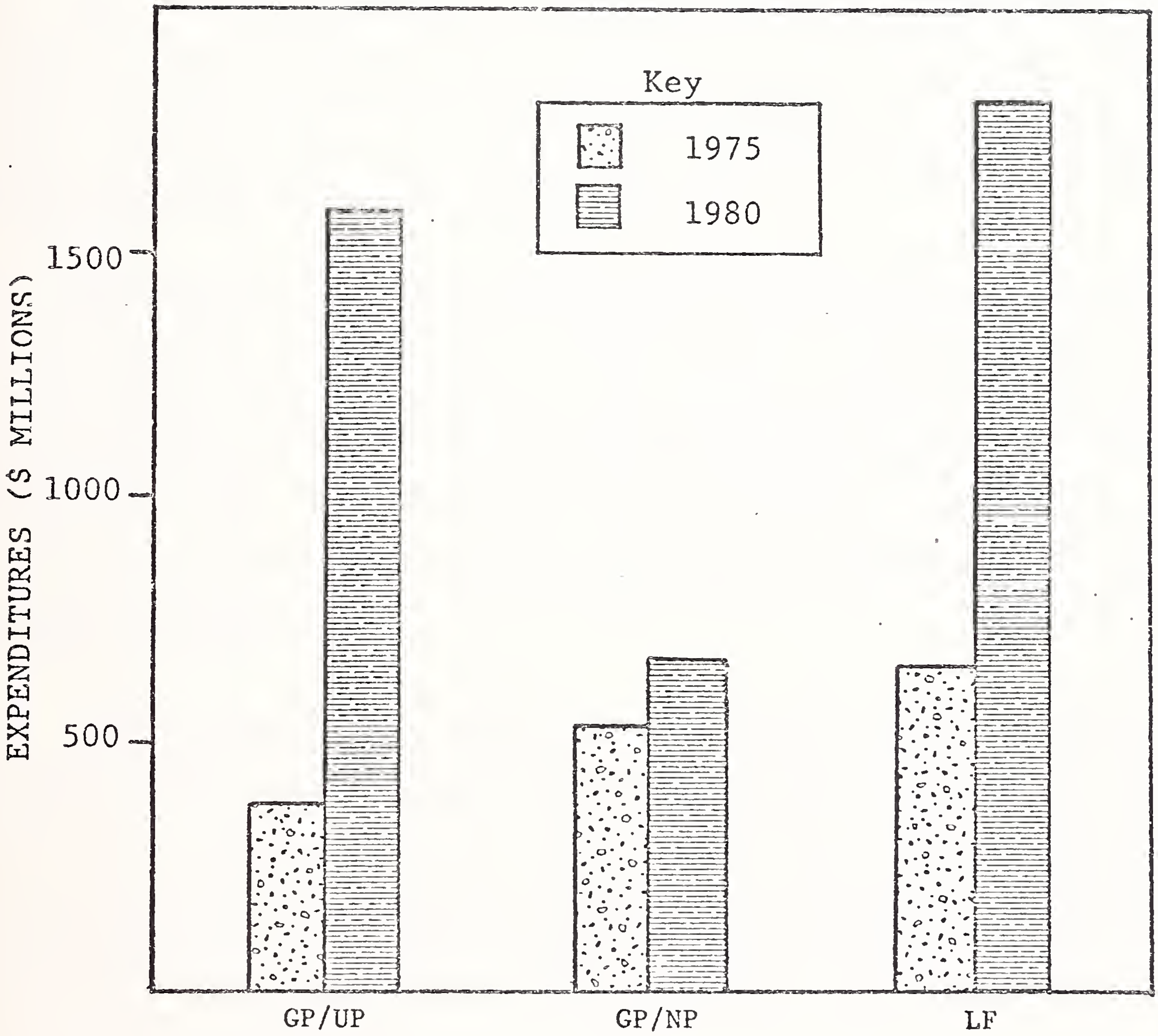

I
STAND-ALONE TERMINAL BUSINESS
1. OEM Purchase (for resale with maintenance & support)
2. Acquire Terminal Manufacturer
GENERAL PURPOSE
INDUSTRY SPECIALIZED
II
OFFER GENERAL TERMINALS WITH EXISTING SERVICE
1. OEM Purchase (for resale with maintenance & support)
OFFER AS OPTION TO MCAUTO CLIENTS
BUY
MAKE
III
INDUSTRY SPECIALIZED PACKAGED SERVICE
1. Select Industry
2. Acquire Expertise in the Service Portion of the Industry
3. Make or Buy Special Terminal
MARKET TERMINAL WITH SERVICE

EXHIBIT II -2

END USER TERMINAL EXPENDITURES
($ Millions)



GP/UP - General Purpose/User Programmable
GP/NP - General Purpose/User Non-Programmable
LF - Limited Function

- At this time, most users prefer to have choices in terminals. Tymshare, for example, offers a line of at least 13 different terminals with the TYMSHARE name on them. These terminals can be purchased, leased, or rented for as little as 90 days.

- The choice of what kind of terminal to manufacture (or manufacturing firm to acquire) should be based on the merits of the product line and the target acquisition alone. In this context minicomputers and microprocessor-based systems must be regarded as terminals.

- Both general purpose and special purpose (limited function) terminals are in a rapidly growing posture. Exhibit II -2, derived from other INPUT research, shows the end user expenditures for terminals in 1975 and forecast for 1980. The growth rate projected for user programmable terminals is 34% per year, average, while that for limited function terminals is somewhat less.

- INPUT recommends that McDonnell Douglas institute one or more OEM agreements with companies which are potential acquisition candidates and offer those terminals as general purpose units, with the MCAUTO label, in conjunction with current MCAUTO offerings. These terminals should be available for purchase, lease, or rent, and include maintenance (McD or substantial third party).

  - This recommendation is independent of the decision regarding a packaged terminal/service.

- If this OEM arrangement leads to an acquisition, it should be McD rather than MCAUTO, because:
  - the operation needs to be independently managed
  - MCAUTO does not have a large enough client base to determine the product line
  - the commitment of the parent company will be important in setting up credible maintenance capabilities.

- Within a few years, consolidation and shake-out of terminal manufacturers is expected, and it will be possible to acquire a good, but undercapitalized manufacturer. If that alternative is preferred to acquiring a strong, well-entrenched company, an opportunity will exist to develop a product line more to McD's specifications.
  - INPUT suggests beginning with a general purpose "intelligent" terminal capable of integrating word processing with data processing (a trend being spearheaded by IBM).

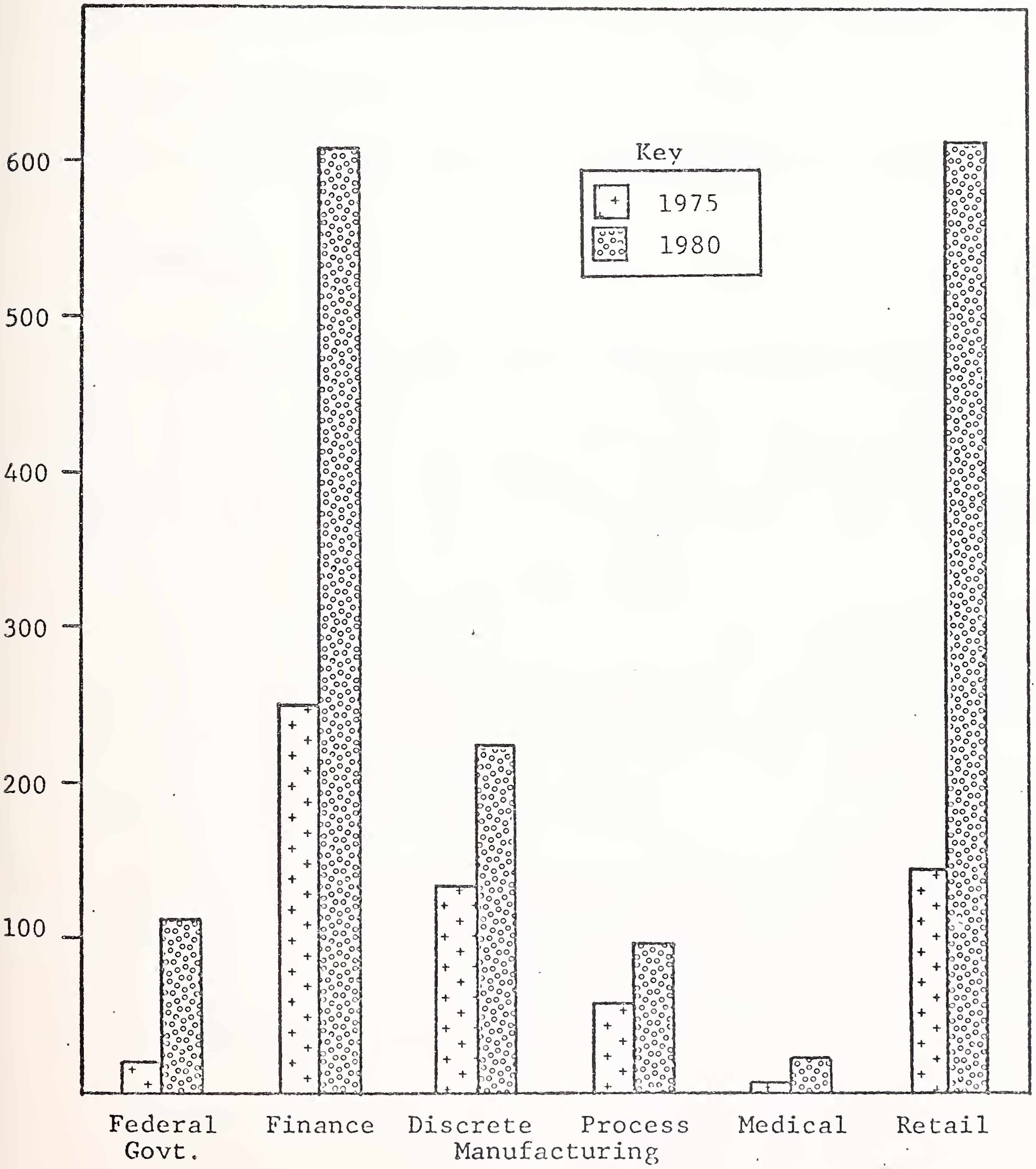
SCENARIO II - OFFER TERMINALS WITH EXISTING MCAUTO SERVICE

- As indicated above, it is not necessary to manufacture in order to provide clients with a proprietary McD terminal. INPUT recommends one or more OEM purchase agreements be made and that at least one of the suppliers be a potential acquisition candidate.

- These terminals should only be of the general purpose intelligent type.

EXHIBIT II -3

LIMITED FUNCTION
TERMINAL EXPENDITURES



- For maximum "marketing" opportunity, terminals must be IBM compatible and able to be used with existing in-house computers or other computer services; this includes implementation of IBM's SDLC system capability.

- INPUT recommends that McD proceed with this option independently of decisions on manufacturing (Scenario I) or packaged services (Scenario III).

SCENARIO #3

- Going ahead with a packaged service requires an industry selection to be made first. This study indicates that a general purpose packaged service has a low level of acceptibility at present. The wholesale distribution industry area appears to offer possibilities. INPUT recommends this for further examination by McDonnell Douglas.

- The other potential industry segment is for users of financial/econometric data bases. This is a relatively small volume market and would first require the establishment of a data base with high demand in itself. We do not recommend it at this time, as a first offering.

- After deciding on an industry, expertise in depth must be acquired. A skilled group can be put together, or an acquisition can be made. The type of company for acquisition in the distribution industry would be Keydata or Management Horizons Data Systems.

- After the industry service group is established, then a choice of terminal or terminal design should be made, consistent with the service

to be offered.

- The earlier (Scenario I) decision impacts the "package" at this point.
    - If a terminal company has already been acquired, the new terminal for the package can be made.
    - If a terminal manufacturer has not been acquired, the terminal specs should be sent out for bid.

- The packaged service can then be actively marketed by both MCAUTO and the acquired industry specialized group or company. Also, versions of the terminals could be marketed directly by the terminal company for use with in-house systems. This makes available a sizable group of potential customers who would otherwise not consider the package for fear of being "locked-in" to a service.

SUCCESSES AND FAILURES IN SPECIALIZED APPLICATIONS

SUCCESSES

- Users spend some $1.5 billion annually (equivalent annual rental) on special purpose terminals, particularly in retail (POS) and financial areas (credit, bank teller terminals, stock brokerage terminals), as shown in Exhibit III-3. Entertainment, airline and hotel reservations are other examples.

- Vendors in these areas who provide the terminal, as well as the service, include:
  - Bunker-Ramo - securities services for brokerage firms, investment companies, and trust departments.
  - GTE - as Bunker Ramo
  - Quotron - as Bunker Ramo
  - Dow Jones News Service - financial news
  - Ticketron - entertainment reservations
  - Xerox Data Systems - manufacturing and distribution services
  - Payfone Systems - payroll and billing

- Except for Payfone and Xerox, the above vendors provide primarily data base services, most of which are merely inquiry.

  - After a slump in the market for stock services during the recession, the 3 stock inquiry services are recovering and expanding into other areas.

- Bunker Ramo is expanding into the insurance industry. In a combined effort with Aetna Insurance, a modified version of BR's-BCS-90 commercial bank teller terminal (a success in its own right) is being used in a system designed to make instant payments on medical and dental group insurance claims. Over 1000 terminals will be installed in 40 offices communicating with Aetna's IBM 370/168.

- In education, CDC has for some time been offering PLATO, an educational system using a special purpose plasma display terminal.

- In the retail area, Service Bureau Corp. (SBC) has just acquired a small retail company. They will tie together POS terminals with a computer service for those firms too small to have their own in-house computer.

- TRW has built a large credit checking business using a proprietary terminal. They have just announced their intention to offer nationwide third party maintenance following their assumption of Singer's commitments.
  - National Data Corp. will also be offering a terminal/service package.

- CDC has a subsidiary American Service Bureau, which is placing microcomputer-based terminals in homes for reporting on the TV programs being watched (1984 is only 8 years away!)

- On a smaller scale, Keydata Corp., a computer services company, is offering a "packaged service" to small businesses as an alternative to minicomputers. The package (System 800) includes:
  - a GE Terminet terminal, with maintenance
  - billing, inventory control, accounts receivable and sales analyses, along with quarterly management reports
  - fixed monthly charge of $800

FAILURES

- There have been several notable failures in the attempt to provide a packaged service:
  - GE's TRADAR, an early POS system developed for J.C. Penney. It failed because of its design which essentially left the stores inoperative when the central computer or the communications failed.
  - Planning Research Corp. and Computer Sciences Corp. (CSC) with reservations systems for rental cars, hotels, etc.
- Both the above suffered from being too early and unable to support the market needs which they were intended to serve.

STRATEGY

- INPUT recommends that McDonnell Douglas evaluate Scenarios I, II and III and proceed cautiously:
  - Select manufacturers and arrange OEM purchases of terminals to be offered with MCAUTO's existing service.

- After examining this report, consider whether or not an industry specialized package might be attractive.
- Select 1 industry (e.g., wholesale distribution) and do an in-depth study of hardware, software and system suppliers, consultants and users in the selected industry.
- Perform an in-depth research program to determine:
    - potential market volume
    - system requirements
    - terminal specifications
- Prepare an ROI business plan.
- If the decision then is to proceed, acquire the industry expertise.
- Prepare the specifications for the system and the terminal.
- Have MCAUTO and the new industry specialists prepare a system specification compatible with MCAUTO's computer service.
- Test market the system with a highly programmable terminal or minicomputer.
- Make or buy the terminal, according to whether or not a terminal manufacturer has been acquired.
- Proceed with advertising, marketing and sales.

III. TERMINAL USER SUMMARY

INPUT

III TERMINAL USER SUMMARY

- 106 users of terminals are included in this study, in the following size groups:

		ANNUAL REVENUES
Very large	43	$ Greater than $300 million
Large	15	$ 100 - 300 million
Medium	22	$ 20 - 100 million
Undefined	26	—
	106	

- A minimum of 24,000 terminals were reported in use by the above users.

- Half of the interviewed users are exclusively in-house users. A substantial portion of the MCAUTO interviewees reported no use of outside service. Totals are, as itemized in Exhibit III-1.

- In-house users only	47
- Some in-house and some outside service	33
- Outside service only	22
- Undetermined	4
	106

- Interest in a package service is relatively low in most industries. Those interviewed who expressed a VERY HIGH, or MODERATE interest in a package service include:

EXHIBIT III-1

PROFILE OF TERMINAL USERS INTERVIEWED

INTER-VIEW #	NAME	SIZE			MINIMUM NUMBER OF TERMINALS	USE OF TERMINALS WITH SERVICES			LEVEL OF INTEREST			
		M	L	VL		0	SOME	100%	VERY HIGH	MOD.	LOW OR NONE	YES/ UNK.
	DISCRETE MANUFACTURING											
101	Mattel Toys			x	58	x						Y
102	Fibreboard		x		20			x				Y
103	Varian			x	85		x				x	
401	Walter Kidde			x	24			x				U
402	Federal-Mogul			x	430	x					x	
403	General Dynamics			x	24	x					x	
404	RCA Astro-Electronic Div.			x	54	x					x	
405	United Technologies			x	3	x						U
	PROCESS MANUFACTURING											
104	Confidential			x	138	x			x			
105	Pendleton Woven Mills	x			4	x					x	
106	Amway		x		48	x					x	
107	California Portland Cement	x			4	x					x	
108	Libby Owens Ford			x	10		x				x	
109	Armour			x	28		x			x		
110	Mobil Oil			x	253		x					

EXHIBIT III-1(continued)

INTER-VIEW #	NAME	SIZE			MINIMUM NUMBER OF TERMINALS	USE OF TERMINALS WITH SERVICES			LEVEL OF INTEREST			
		M	L	VL		0	SOME	100%	VERY HIGH	MOD.	LOW OR NONE	YES/ UNK.
	TRANSPORTATION											
111	Seaboard Railroad			x	1,200	x					x	
112	Delta Airlines			x	3,400	x						Y
113	Aloha Airlines	x			13	x						Y
114	Flying Tiger			x	100	x					x	
115	Bay Area Rapid Transit	x			31		x			x		
116	UTC Air Transport	x			115	x					x	
117	Gateway Trucking	x			165	x					x	
	UTILITIES											
118	Consolidated Edison(N.Y.) (2 interviews)			x	2,600		x				x	Y
119	Citizens Gas & Coke Utility	x			3	x					x	
120	New England Gas & Electric		x		50	x						Y
121	Northeast Utilities			x	60	x						Y
122	Public Service of New Jersey		x		167		x				x	

EXHIBIT III-1(continued)

INTER-VIEW #	NAME	SIZE			MINIMUM NUMBER OF TERMINALS	USE OF TERMINALS WITH SERVICES			LEVEL OF INTEREST			
		M	L	VL		0	SOME	100%	VERY HIGH	MOD.	LOW OR NONE	YES/ UNK.
	BANKING & FINANCE											
123	Chase Manhattan				256		x					Y
124	Citicorp				240		x				x	
125	Wells Fargo				45		x				x	
126	Security Pacific				83		x				x	
127	Chemical Bank				75			x			x	
128	Manufacturers Hanover Trust				74		x			x		
129	Glendale Federal S&L				3			x		x		
130	Brentwood S&L				1			x			x	
	INSURANCE											
131	United Pacific	x			24	x					x	
132	Fireman's Fund American			x	205	x				x		
133	Crum and Forster			x	48		x				x	
134	All American Life		x		40	x				x		
135	Family Life Ins.	x			21	x					x	
411	Aetna Variable Annuity	x			1,000	x					x	
412	General Adjustment Bureau	x			1			x			x	
413	General American Life		x		5		x				x	
414	Lincoln National Life			x	51	x						U
415	Travelers Insurance	x			-		x					U

EXHIBIT III-1(Continued)

INTER-VIEW #	NAME	SIZE			MINIMUM NUMBER OF TERMINALS	USE OF TERMINALS WITH SERVICES			LEVEL OF INTEREST			
		M	L	VL		0	SOME	100%	VERY HIGH	MOD.	LOW OR NONE	YES/ UNK.
	RETAIL											
136	A&P			x	1,810	x						Y
137	Macy's			x	2,000 +	x					x	
138	Victoria Station	x			5	x					x	
139	Quality Foods, Inc.	x			1	x					x	
140	Consumer's Co-op	x			0	x					x	
141	AMFAC		x		1,000 +	x					x	
142	White Stores		x		150	x			x			
143	Handy Andy		x		0	x					x	
144	Neisner Bros.		x		11	x				x		
	WHOLESALE											
145	Golden State Foods		x		8	x					x	
146	Darilea Cooperative			x	50	x			x			
147	General Wholesale	x			7			x	x			
406	Honda			x	–							U
407	Nissan Motor Corp			x	178		x					U
408	Ponder and Best	x			60	x						U
409	Toyota			x	203		x				x	
410	Volvo of America		x		5	x					x	

EXHIBIT III-1 (continued)

INTER-VIEW #	NAME	SIZE			MINIMUM NUMBER OF TERMINALS	USE OF TERMINALS WITH SERVICES			LEVEL OF INTEREST			
		M	L	VL		0	SOME	100%	VERY HIGH	MOD.	LOW OR NONE	YES/ UNK.
	FEDERAL GOVERNMENT											
148	NASA Ames				198		x					Y
149	HEW (Office of Research & Statistics)				115	x					x	
150	Department of Commerce				250	x					x	
151	National Credit Union				102		x				x	
152	Social Security Administration				2,300	x						Y
	EDUCATION											
416	Compton Unified School Dist.				12	x						U
417	University of Illionis				450	x					x	
418	University of Missouri				35	x						U
419	New Mexico State University				50	x					x	
420	Santa Barbara City Schools				4							U

EXHIBIT III-1 (continued)

INTER-VIEW #	NAME	SIZE			MINIMUM NUMBER OF TERMINALS	USE OF TERMINALS WITH SERVICES			LEVEL OF INTEREST			
		M	L	VL		0	SOME	100%	VERY HIGH	MOD.	LOW OR NONE	YES/ UNK.
	CONSTRUCTION											
421	Austin Co.			x	6			x				U
422	Black and Veatch	x			-							U
423	Browning-Ferriss Industries			x	7		x					U
424	Frederick Harris, Inc.				2			x				U
425	Howard,Needles, Tamman & Bergendoff	x			-			x			x	
426	Icarus Corp				9			x			x	
427	International Engineering											U
428	Litwin Corp	S			4			x			x	
429	R. M. Parson											U
430	Sargent & Lundy	x			18			x			x	
	SERVICES											
153	Confidential			x	3		x				x	
154	Arthur Andersen			x	143		x		x			
155	Skidmore, Owings & Merrill				9		x				x	

EXHIBIT III-1 (continued)

INTERVIEW #	NAME	SIZE			MINIMUM NUMBER OF TERMINALS	USE OF TERMINALS WITH SERVICES			LEVEL OF INTEREST			
		M	L	VL		0	SOME	100%	VERY HIGH	MOD.	LOW OR NONE	YES/ UNK.
	OTHER (INTERVIEWS)*											
156	Confidential			x	487		x				x	
157	Holiday Inns			x	1,950	x				x		
158	Warner Bros.		x		116	x					x	
159	Johns Manville			x	91		x				x	
160	Hoffman LaRoche				274		x				x	
431 *	Aminoil USA (HQ)			x	5			x			x	
432 *	Aminoil USA (Houston)			x	2			x				U
433	Dart Industries			x	10			x			x	
434	Nationwide Financial Services				313		x				x	
435 *	Ralph's Grocery Store				25	x						U
436 *	Southern Pacific Transportation Co.			x	1		x					U
	DATA BASE USERS											
161	Kaiser Aluminum				13		x				x	
162	Manufacturers Hanover Trust			x	5			x		x		
163	Wells Fargo			x	6		x				x	
164	Kaiser/Aetna				3			x		x		
165	Crocker National			x	5			x		x		

* Some of these interviews would more appropriately go in an industry sector but were received after these industry sectors were written up.

EXHIBIT III-1 (continued)

INTER-VIEW #	NAME	SIZE			MINIMUM NUMBER OF TERMINALS	USE OF TERMINALS WITH SERVICES			LEVEL OF INTEREST			
		M	L	VL		0	SOME	100%	VERY HIGH	MOD.	LOW OR NONE	YES/ UNK.
	DATA BASE USERS (continued)											
166	Irvine Co.		x		2			x			x	
167	Pillsbury				216		x				x	
168	Crown Zellerbach				3			x			x	
169	ARCO			x	7		x			x		
170	General Tire			x	2			x			x	

- VERY HIGH
    - Confidential - process manufacturing
    - White Stores - retail/wholesale
    - Darilea Cooperative - wholesale
    - General Wholesale - wholesale
    - Arthur Andersen - CPA firm
- MODERATE
    - Armour - process manufacturing
    - Bay Area Rapid Transit - local passenger train
    - Manufacturers Hanover Trust - bank
    - Glendale Federal S & L - savings & loan
    - Fireman's Fund American - insurance
    - All American Life - insurance
    - Neisner Brothers - retail
    - Holiday Inns - motel chain
    - Kaiser/Aetna - data base user
    - Crocker National - data base user
    - ARCO - data base user
- Some interviews are marked Y or U on Exhibit
    - Y means "yes," there is interest, but level of interest was not established.
    - U means "unknown"

- Items concerning the degree of use of the terminals and the industry specific applications for which they are used, are included in the industry sector write-ups which follow.

- Information on EDP decision makers is included in each industry write-up.

- There are two classes of terminal users: those who "never" change(d) terminals, and those who do/did.
    - Those who change terminals do/did so in 2-4 years. Reasons offered include price/performance improvements and dissatisfaction with maintenance/support. About 3 years ago there was a major upgrade of terminals from 15 to 30 cps varieties.
    - Those who do/did not change terminals, either:
        - have not had them long enough (less than 2-4 years)
        - have highly specialized terminals, such as airline reservations terminals
        - have purchased them; (usually for special applications such as POS).
- Terminal vendors are sometimes changed, sometimes not, when the terminals are changed.
    - IBM users usually upgrade within IBM.
    - Vendors are usually changed when maintenance and support are found inadequate.

- Computer service vendors are usually not changed when terminals are changed. The two offerings are viewed as independent decisions, unless a special purpose terminal/service is being used. Vendors are usually changed due to dissatisfaction with existing service or inability to expand to new requirements.

- The main criteria in selection of a computer services vendor are:
  - cost/performance
  - support
  - specialized software requirements, usually for packaged software products, as in engineering and construction.

- The main criteria in selection of a terminal are shown in Exhibits III-2 and 3.
  - Technological requirements are generally less important than reliability, vendor's maintenance capability and price.
  - The major technological requirement is adequate I/O speed.
  - Intelligence requirements vary by industry and are detailed in the industry writeups.
  - Intelligence requirements are nearly always expected to increase, although many interviewees indicate no present, and little future requirements for intelligence. Credit terminals are an example.
  - Future selection criteria are generally expected to remain fairly constant in general the characteristics group (maintenance, cost).
  - Technological requirements are generally expected to become somewhat more important in the future, particularly I/O speeds, peripheral devices and intelligence.

EXHIBIT III-2

TERMINAL SELECTION CRITERIA

CRITERIA	NUMBER OF RESPONDENTS RANKING RANK 1=unimportant;5=most important				
	1	2	3	4	5
A. Price	2	9	25	40	23
B. Reliability	-	-	2	25	77
C. Vendor's Maintenance Capability	-	1	6	35	58
D. Software Available	12	20	21	24	18
E. Vendor's Name	24	21	35	16	5
F. References From Other Users	12	23	25	31	12
G. Lease Buy Options	18	15	31	18	4

OTHER IMPORTANT CRITERIA	NUMBER OF TIMES MENTIONED
Wide Carriage Capability	4
Quiet Operation	4
IBM Compatibility	3
Financial Soundness of Vendor	2
Warranty Period	1
Portability	1

EXHIBIT III-3

IMPORTANCE OF TECHNOLOGICAL FEATURES

TECHNOLOGICAL FEATURES	NUMBER OF RESPONDENTS RANKING RANK 1=unimportant;5=most important				
	1	2	3	4	5
A. I/O Speeds	4	6	23	33	30
B. Peripheral Devices Available	15	14	31	26	9
C. Storage Capacity	15	16	27	26	9
D. Flexibility for Unplanned Applications	9	11	30	25	19
E. Degree of Intelligence	12	26	15	29	13

  - Flexibility for unplanned applications is important mainly to those users who use the more general purpose intelligent terminals.

- There is no objection to buying/leasing a terminal from a computer services vendor.

  - Users express concern, however, about becoming "locked in" to a vendor because of his terminal. They prefer the terminal to be flexible and compatible enough to be usable with in-house equipment and other services vendors as well.

- Important trends anticipated by users include:

  - increased local intelligence
  - use of micro/minicomputers as terminals
  - portable terminals
  - distributed processing
  - higher speed local printing
  - graphics capability (hard copy) at the terminal

- Terminal prices are expected to come down, with the reduction in 2 years doubled in 5 years.

  - CRTs are expected to come down 10-15% in 2 years, 20-30% in 5 years.

  - Teleprinters, 5-10% in 2 years, 10-20% in 5 years, due to limitations imposed by the mechanical elements.

  - Remote batch terminals are expected to drop twice as fast as CRTs because of the increasing capability of CRT terminals to function as remote batch terminals. Thus, reductions of 20-30% in 2 years, 40-60% in 5 years are forecast.

- Users' comments on sales people are not highly discriminating. However, it is clear that information services salesmen are more highly regarded and are considered to be:
  - smarter
  - more concerned with the user
  - more knowledgeable about the user's business
  - more capable of helping the user solve problems
  - less pushy

- Recommendations offered by users to the potential packaged services vendor most often reflect their current problems with their systems and include suggestions for:
  - better maintenance
  - more support
  - increased cost-effectiveness
  - increased knowledge of the specific industry, business and application.

- The major concern about a packaged service is the loss of flexibility in choosing the most appropriate terminal and the "best" information service vendor.

A. INDUSTRY SECTOR - DISCRETE MANUFACTURING

- Number of interviews:

	INPUT	McD	TOTAL
Very large	2	5	7
Large	1	0	1
Medium	0	0	0
	3	5	8

- Despite their size, these firms are only modest users of terminals, typically in the range of 25-50 units. United Technology is an exception with about 600 terminals in use.

- There is a mix of in-house and outside services:
  - The one large firm (Fibreboard) and two very large firms (Walter Kidde and RCA Astro-Electronics) use outside services only.
  - One very large firm (Varian Associates) uses outside service 20% of the time. United Technology uses outside service with about 2% of its terminals.
  - The other 3 use only in-house EDP.

- Outside service is divided among timesharing and remote batch.
  - Walter Kidde is on-line 24 hours per day and RCA is on-line for 8-10 hours per day.

- In-house service is mainly remote batch followed by timesharing and inquiry.

- Applications identified by outside service users include:
  - data collection, data entry, and text editing
  - general financial
  - engineering/scientific problem solving (RCA only)

- Applications identified for in-house use include general financial processing and management reporting.
  - United Technology is primarily engineering oriented.

- While there is no objection to using terminals provided by a services vendor. There is little enthusiasm for a packaged service.
  - The primary interest is in software.
  - Cost considerations follow closely.

- Those who specified applications which might be of interest in a packaged service indicated:
  - "computer aided design--only non-business applications"
  - "structural design and analysis"
  - "graphic display--technical areas only"
  - "same software as we are using now in-house"

- Decision making usually resides with EDP or MIS management, although financial personnel may have ultimate power over financially oriented systems. Engineering will choose the terminal and outside service for engineering problem solving.

- Terminals are seldom, if ever changed.

- The computer services vendor is generally not changed if/when terminals are changed.

- When outside services are used, vendor selection is based on:
  - price
  - applications software available
  - service/support

- Terminal selection criteria mainly stress reliability.
  - Vendor maintenance ability, price and references are next in importance.

- Local intelligence is rated undesirable by some users. Most have little or no need for intelligence today but believe the need is growing.

- Future trends perceived include:
  - increased intelligence in terminals
  - greater flexibility (multi-function capability)
  - 1 user sees increased decentralization and distributed processing
  - 1 user sees more centralization with "dumb" terminals.

- While most respondents expect terminal prices to decrease, 3 believe CRT prices will increase, possibly due to increased performance capability.

- Most comments regarding sales personnel qualities are too general to be of value. However, computer services salesmen are seen as more knowledgeable of the total requirements than are terminal sales people.

- Concern for EDP management control over the user's program development, and the desire for flexibility of use of the terminal with in-house or other hardware suppliers are apparent.

B. INDUSTRY SECTOR - PROCESS MANUFACTURING

- Number of interviews:

Very large	4
Large	1
Medium	2
	7

- Except for 1 interviewee (Mobil), there is virtually no use of outside services reported.
  - Nearly all of Mobil's 253 terminals are used 20% outside
  - 2 of Armour's terminals are used outside part-time
  - 1 of Libby Owens Ford terminals is used only outside.
- All outside usage reported is in timesharing mode.
- Inside use is mainly remote batch with some batch and inquiry.
- On-line terminal usage ranges from 1 hour to 10 hours.
- Most users lease most of their terminals.
- A wide range of financial and management reporting applications are reported. In addition:
  - Mobil Oil is a major APL user for scientific and engineering applications
  - (Confidential), a home and personal health care products firm does clinical research and drug studies.

- Interest in a single vendor packaged service is low, except for:
    - Armour reports a moderate interest, particularly in single vendor maintenance for their entire network, which now includes 6 different terminal manufacturers.
    - (Confidential) reports a "very high" interest, "if the price is right."

- No special applications areas were indicated, except by Pendleton, who would be interested in "an optical scanning system to input sales information from salesmen."

- In most cases, decisions regarding packaged service, terminals, and computer services are vested in the same individual;
    - In all but one case, the individual is a key person in EDP operations.
    - Mobil allows each operating unit to choose its own terminals from an approved list.
    - California Portland Cement's decision maker is the Controller.

- Those who have had terminals for more than just a few years report changing terminals on the average of 2-3 years.
    - Libby Owens Ford reports changes occur 15-20 years.

- Reasons for changes vary:
    - 2 users changed from Datapoint because of software problems
    - 2 changed based on cost-performance
    - 1 upgrades with IBM

- All respondents ranked reliability and maintenance as very important (Rank 5). No other items were ranked 5, except:
  - Vendor's name - 1 user
  - Software - 1 user

- A gradual increase in local intelligence is expected, along with a trend toward distributed computing. Mobil considers the IBM 3270 adequate. Others expect to go to local minicomputers (IBM 32, Peachtree) as local intelligence requirements increase.

- Only 2 users would estimate the extent of terminal cost reductions, although all expected prices to come down. Estimates ranged 10-20% in 2 years, to 25-50% in 5 years, except for teleprinters whose reduction would be 10% in 5 years.

- Mobil comments that a packaged service is a high risk for a computer services vendor due to service and maintenance problems associated with terminals.

- Other comments include ease of use, industry specialization, and reliability as important.

- Salesmen are mostly expected to know their product.

- One company, Utah International, declined to be interviewed because "vendors don't want to come to where mines are located." If this observation is true, the mining industry might be worthy of examination by MCAUTO as a potential services market, considering MCAUTO's engineering/construction specialization.

C. INDUSTRY SECTOR - TRANSPORTATION

- Number of interviews: 7

Very large	3
Large	0
Medium	4
	7

- Except for BART (Bay Area Rapid Transit), all respondents use their terminals in-house only.
  - BART has 9 DEC Writers and 1 ADDS 680 on outside timesharing. The former is for reporting and distributing trouble information; the latter is for program development.

- These firms tend to be large users of terminals due to the wide geographic activity inherent in their business:

FIRM	TYPE	TOTAL NUMBER OF TERMINALS
- Seaboard Coastline	Railroad	1200
- Delta Airlines	Airline	3400
- Aloha Airlines	Airline	13
- Flying Tiger	Air Freight	100
- BART	Passenger Trains	31
- WTC Air Freight	Air Freight	115
- Gateway Transportation	Trucking	165

- Batch/Remote batch and Inquiry are the major modes of usage.

- Billing, routing, reservations and message switching are the main applications, with system maintenance (trucks, trains, planes) scheduling a specialty application.

- Except for Aloha, terminals are on-line 24 hours per day.

- Terminals are owned, rather than leased.

- Interest in a packaged service is low or lacking, on the average. These firms have well-developed in-house systems:
  - BART reports a moderate interest in a trouble reporting system, including terminals and computer processing, excluding software and network. They are a relatively new organization in the San Francisco Bay Area and are still evolving.
  - Delta reports some interest, but "no way any commercial network could provide services I need."
  - Aloha reports some interest, but has already rejected a packaged offer from Continental, a major vendor of packaged EDP services to the airline industry.

- If any package of interest were to be developed, respondents would want to help to create it.

- In the medium-sized firms, the EDP director makes the decision about EDP acquisition alone, or, in one case, requires V.P. finance approval.

- In the very large firms, EDP decisions are at V.P. level.

- Terminals, largely because they are owned, are not usually changed. Most firms merely add more terminals as required without trading in old ones.

  - Flying Tiger replaced 75 teletypes with Incoterm 20/10, which they own.

- Vendor's maintenance capability ranks 5 (very important) in all interviews, followed by reliability and price.

- Local intelligence is not now seen as very important, particularly as many of the terminals are simply used for inquiry.

  - Special purpose terminals (e.g., reservations) will continue to be used.

- Future trend toward increased intelligence is expected, but not especially required. Terminals may become combined with, or replaced by minicomputers.

- Some expectation of a trend toward distribution of processing capability is indicated--however slight.

- Slight price reductions are anticipated for all terminals.

- A package vendor as well as terminal and computer services vendors and salesmen are expected to know the industry and its application.

D. INDUSTRY SECTOR - UTILITIES

- Number of interviews: 5

Very large	2
Large	2
Medium	1
	5

- Three (3) respondents (1 in each size category) use in-house EDP only.
  - The other 2 (Consolidated Edison, NYC, and Public Service of New Jersey use outside services for timesharing only, 50% and 15%, respectively).

- Numbers of terminals range from 3 (Citizens Gas and Coke Utility) to over 2,000 (Con Edison).

- Outside service is in use either 8 or 24 hours per day. The former use terminals on-line for 4 hours or less; the latter are on-line 24 hours, 6 days per week.

- Inside service is primarily timesharing and inquiry, ranging from 4-18 hours a day on-line.

- The level of interest in a packaged service is low. Where interest is expressed, it is mainly in an on-line inquiry system for customer service.
  - (This could be comparable to a special purpose system such as airlines reservations.)
  - Mostly, respondents appear to want to stick with what they have. They've developed systems which suit their needs.

- EDP decisions tend to reside with the management of EDP operations.

- Terminal turnover rate appears to be high, occurring between 1 and 4 years. Four years ago, one of the motivating reasons for change was an upgrade from 15 to 30 cps.

- Most often, the terminal vendor was changed at the time the terminals were changed. The main reason is price, followed by increasing performance capability.

- The timesharing service vendor was not changed when the terminals were changed.

- Reasons for choice of timesharing vendor include:
    - applications specialty
    - price/performance
    - IBM compatibility

- Computer services vendors are not changed very often.
    - Con Edison does annual comprehensive procurement, devoting about 2 months for competitive selection.

- Generally speaking, large numbers of services vendors are used when outside service is used. Public Service of New Jersey is trying to get down to 10 or fewer vendors.

- Utilities' users of outside services are large dollar users, in spite of their propensity to inside service.
  - Con Edison spends $250 thousand per month on timesharing.
  - Public Service of New Jersey spends $60 thousand per month.

- While reliability and vendor maintenance capability are the major criteria for terminal selection; price ranks equally in many cases.

- Except for 1 user (Citizens Gas & Coke), respondents see minimal importance in local intelligence now but expect it to become more important in the future.

- Other future trends indicated include:
  - distributed processing
  - portable terminals
  - proliferation and fallout of terminal vendors
  - local storage to enable graphic display.

- Users expressed uncertainty as to terminal pricing trends. There is a general impression that prices should go down.

- Salesmen are expected to know their product and to be able to demonstrate it.

- Con Edison says a packaged product would have to be "spectacular" for them to be interested.
  - Others expressed the difficulty of selling such an item to a large utility.

- Con Edison reports that "GE is really going out of the terminal market."

E. INDUSTRY SECTOR - BANKING & FINANCE

- Number of interviews:

Banks	6
S&L	2
	8

- Bank use of outside services varies widely:
  - Chemical Bank (assets $24B) has 75 terminals all used exclusively with outside service for a full line of banking, financial, and MIS, spending $120,000 per month outside.
  - Security Pacific (assets $15B) has 83 terminals used over 95% with in-house computers for a similar range of applications, spending $7,000 per month outside.

- Both Savings and Loans interviewed, although they use outside services exclusively, have only 1 and 3 terminals respectively which are used for planning, budgeting, and financial management. Their combined outside expenditures are $4,000 per month.
  - Also of significance is their relatively small size: $500 million and $3 billion in assets, respectively. The smallest bank interviewed has $12 billion in assets.

- Outside service, when used, is typically an 8 hour activity, although 3 banks are active 10, 16, and 24 hours, respectively.

- The primary mode of use of outside service is timesharing with some

small amount of remote batch reported.

- There is a low degree of interest in having the terminal combined with the timesharing service.
  - The terminal needs to be able to access other timesharing systems including internal timesharing system.
  - The user must be convinced that the vendor can handle the aspects of terminal reliability and maintenance. A national company able to serve smaller urban areas would be more credible.
  - Specialized applicational areas are possible:
    - word processing
    - informational storage and retrieval abstracting
    - real estate transactions
    - leasing.
  - Single source billing and support is attractive to some.

- One bank and one Savings & Loan reported a moderate interest in the packaged approach, with others reporting low or none. All but 3 of the total responding clearly wish to separate the terminal vendor from the processing. One reason seems to be the desire to use more than one services vendor.

- Chase Manhattan can visualize such a package service in a highly specialized area such as third market securities trading, if they were convinced of the vendor's technical expertise and maintenance capability.

- Users do not usually change computer service vendors when changing terminals.

- Computer services vendors are chosen on the basis of specialized application knowledge and overall cost-effectiveness.

- Computer services vendors are infrequently changed, once established. The main reasons for changing relate to poor service and user dissatisfaction.
    - Some banks use as many as 15-20 vendors and will drop low performance vendors without replacing them. The work is allocated to other vendors, resulting in consolidation.

- Input/output speeds are still very important.
    - Users want to go to 4800 b for printing and graphics output.

- Banks have significant need for networking capability, but at the present time Savings and Loans do not.

- Maintenance capability and reliability are top-rated criteria for terminal selection reported by all respondents.

- Most users would like a future intelligent terminal with software to do:
    - data entry
    - data edit and validating
    - interface with timesharing data base
    - talk to other terminals
    - output or display off line
    - IBM compatible or capable of emulation

- Users are staying in-house because of high timesharing costs, storage costs, and uncertainty in timesharing charges per job.
  - Combined offering of a timesharing terminal and a level of service for a fixed price would be interesting.
  - Several users are considering or are getting minis to go in-house for most financial and management information systems.

- Decisions on terminals, services, and potential use of a packaged system are made by the same person. There is some variation among institutions where this person may be the head of the data processing activity or a higher level vice president.

- Most users felt that for a vendor to offer the combined approach, he must:
  - offer "value added" to terminal
  - be responsive to user needs
  - demonstrate capability to handle maintenance
  - have a highly reliable system
  - be cost-effective and demonstrate it by running benchmark problems.

- Terminals were changed widely 3-4 years ago as an upgrade from 15 to 30 cps. Periodic changes every 3-4 years seem typical due to some form of obsolescence encountered.

- Most users do not change terminal vendors when they upgrade terminals.

- Some users favor "dumb terminals" using sophisticated microprocessors (9600 b) for communications and control of a terminal cluster.

- One user believes that Texas Instruments is the vendor who would achieve significant leadership.
  - TI 745 is a hot seller
  - Competition to IBM 3270 is due soon.
  - Terminals have high level language interpreters:
    - Basic
    - APL
    - ANSI COBOL

- Future trends in terminals and computer systems include:
  - small portable terminals that hook up to a timesharing system
  - terminals capable of communicating with each other
  - increasing use by the banks and S&Ls of intelligence in terminals
  - increase in vendor specialization and system orientation
  - competitive pressure on timesharing vendors, as well as in-house systems, from lower-priced minicomputers which will be much like terminals.

F. INDUSTRY SECTOR - INSURANCE

- Number of interviews: 10

INPUT	MCAUTO	Total
5	5	10

  - In addition to the 5 completed by INPUT, 4 more were partially completed.

- Of the 14 companies interviewed, only 4 indicated any use of outside service - 3 of the MCAUTO interviews, and 1 of INPUT's.

- Outside service represents a use of less than 1% of all the terminals reported. The remainder are used with in-house systems.

- Timesharing and remote batch are the major modes of use overall.
  - Outside service use is mainly timesharing.

- In-house use is typically 8-10 hours daily, with 1 company (Aetna) reporting 12-24 hours on-line usage for processing insurance applications.

- Of those responding to the question, nearly all lease their terminals. Three companies owned some and leased some.

- Applications in this industry are specialized and include:

APPLICATION	MODE T/S	MODE R/B	MODE B	MODE I
Policy application and benefit processing	x	x		
Actuarial accounting, rate making	x			
Policy information, renewal data				x
Sales illustrations				x
Medical & group insurance processing	x		x	
Program development	x			

- Interest in a packaged service is low. Two users (among the largest) expressed a moderate interest. All American would want to be in on the development; Fireman's Fund would not.
  - In spite of this interest, both reported a preference for acquiring terminals and processing separately.
  - Neither clearly defined a specific application of interest.
  - Respondents expressed a strong bias toward in-house EDP.

- Aetna indicates a specific recommendation to MCAUTO to maintain its present approach: "Don't change--Don't offer something not needed."
  - Aetna also believes that Grumman already has a packaged service.

- Several comments regarding data security and client privacy suggest an important reason for in-house data processing. Similar comments have been received from banks, stockbrokers, etc.

- MCAUTO interviewees indicate EDP decisions are made by users in conjunction with EDP management personnel. INPUT interviewees indicate EDP decisions are made at Vice President level, frequently by a V.P. not related to EDP. No correlation factors are apparent.

- Terminal changes are made frequently, typically 1-3 years, although some respondents have not had terminals long enough to be ready for change or upgrade.
    - Higher performance and lower cost are cited as the main reasons for change.
    - Terminal vendors are sometimes changed when terminals are upgraded--and sometimes not.
    - IBM compatibility is important.

- Insurance users do not object to buying/leasing their terminals from a computer services vendor.

- Reliability and maintenance are highly ranked (4 or 5) by all respondents.
    - In this group we see a high level of importance placed on price. In 6 interviews, price is rated equal to or higher than reliability.

- Degree of local intelligence rates high (4 or 5) in this group.
  - All respondents see need for increasing local intelligence in the near future.

- Trends perceived include:
  - increased on-line terminal activity in a timesharing mode.
  - moves toward the use of minicomputers and distributed processing
  - combination of word and data processing in terminals.

- All but one respondent expect terminal prices to decrease, with few respondents indicating how much. They average around 10% in 2 years.
  - One respondent (General Adjustment Bureau) comments: "Don't buy from MCAUTO--they add 20% installation charge."

- Responses were not useful regarding salespersons' characteristics.

- Of those vendors using outside services, albeit sparcely, important selection factors include the standard factors:
  - price
  - reliability
  - service
  - applications offered

- Users do not change vendors often unless service degrades or becomes too costly.

G. INDUSTRY SECTOR - RETAIL

- Number of interviews:

Very large	2
Large	4
Medium	3
	9

- Only 1 firm interviewed (AMFAC Merchandising Corporation, San Francisco) uses any outside computer service (Electronic Data Systems). All others have in-house computers.

- In addition to general accounting, major terminal applications include:
  - Point of sale terminals and systems
  - Data entry for inventory control and merchandise distribution
  - Credit card inquiry

- Batch/Remote Batch and Inquiry are the only processing modes used.

- Terminals typically are used 8 hours per day (normal store hours). Two firms reported 12 hour use.

- POS terminals are owned outright. They are not available on lease. Rapid changes of ownership are thus discouraged, in spite of rapid technological changes.

- Level of interest in a package service approach is low, on the average, "due to an on-going commitment to in-house computers".
  - Only 1 interviewee (White Stores, Inc., Wichita Falls, Texas).

indicated a "very high" interest in leasing a system to replace his existing warehouse distribution operations. Contact: Mr. Steve Wyandt, Director of Data Processing, (817) 692-3410.

- No particular objections to acquiring terminals from a services vendor were expressed.

- EDP procurement is generally recommended by the manager of the DP center and requires approval higher up (Controller, EDP committees, Board of Directors).

- Requirements for local terminal intelligence are negligible, although some see a trend in that direction.

- Other trends predicted include:
  - Distributed processing at individual stores, with local computers providing the intelligence.
  - Improved POS stations (better scanners, universal merchandising codes).

- Price trend expectations are for 5-10 percent reductions in 2 years, remaining stable thereafter, due to inflation and product improvement. Most respondents had no opinion.

- Vendor salesmen are expected to know the industry and the specific customer's requirements.

H. INDUSTRY SECTOR - WHOLESALE

- Number of interviews:

	INPUT	McAUTO	TOTAL
Very large	1	1	2
Large	1	-	1
Medium	1	1	2
Unknown	-	2	2
	3	4	7

- Three users had less than 10 terminals; the remaining 4 had 50 or more each.

- Of the 7 interviewed, only 1 (Toyota) used terminals in conjunction with outside services.
  - The Toyota system using 150 ASR-33 teletypewriters and 7 Texas Instruments TI 742S,is an unattended, auto-dial dealership inventory control system.
  - The Toyota terminals are on-line less than 1 hour per day and off-line 2-3 hours per day in a remote batch mode.

- Inside operations are only remote batch in 5 of the 7 respondents and partial timesharing in the other 2.

- Actual hours of on-line use vary from fractional, to 24 hours per day, averaging 8-10 hours.

- Applications are mainly related to inventory management, distribution, billing, and other financial processing.

- This industry shows a higher than average interest in a packaged system. At least 2 users (Darilea Cooperative and General Wholesale Co., Inc.) express a very high interest.

- All respondents indicated that if they were to acquire such a packaged service, they would want the terminal, processing service, and applications included. Two (2) were not necessarily interested in the communications network.

  - None had objections to getting the terminal from the computer services vendor.

- Specific applications of interest include:

  - distribution and inventory control
  - general financial accounting

- Two users would be interested in updating their existing systems.

- A preference for turn-key system installation was expressed.

- EDP decisions are generally recommended by operational users and made by the head of EDP activities, apparently below the V.P. level.

- Most users have never changed terminals. The 2 who have (NISSAN Motors and Toyota) have done so at 2-4 year intervals, based on:

  - "state of the art and cost"
  - "upgrade and reliability"

- Users divided 50/50 on the question of whether terminal vendors would be changed when terminals are changed.

- Reliability is consistently ranked highest in importance in terminal selection, followed by vendor maintenance, capability and price.

- Current requirements for intelligence tend to be high with future trending toward increasing intelligence.

- Other trends reported included:
    - increased use of micro/minicomputers
    - distributed processing
    - more general purpose terminals

- While all users expect terminal prices to decrease, there is a wide range of expectations from 5% to 30% in 2 years and from 10% to 50% in 5 years.

    - This group is not expecting remote batch terminals to decrease faster than CRTs, contrary to the belief of most other industry sectors. One respondent believes remote batch terminals "may go up slightly."

- Comments regarding sales personnel characteristics are routine.

I. INDUSTRY SECTOR - FEDERAL GOVERNMENT

- Number of interviews: 5

- Those interviewed are fairly large users of terminals:

- NASA Ames	198
- HEW Office of Research and Statistics	125
- Bureau of Standards, Computer Services Division	250
- National Credit Union Administration	100
- Social Security Administration	2300

- Except for NASA Ames, all terminals are used in conjunction with government computers exclusively.

  - NASA Ames uses an outside service about 10 hours per day, during which time 12 of their terminals are on-line an average of 2 hours, doing engineering/scientific problem solving in an RJE mode connected to a CDC 7600. All other work is with internal timesharing.

- The SSA system is strictly a data acquisition and inquiry service, on-line 14 hours per day, primarily for determining Social Security check payments.

- The National Credit Union uses all modes internally for financial and personnel records and data base applications.

- Bureau of Standards supports scientific and statistical work in all modes approximately 75% of the time and is connected to a Univac 1108. The remaining 25% is administrative and accounting activity.

- The Office of Research & Statistics uses timesharing for the development of statistical programs and data bases. Batch mode is used for scientific analysis.

- The level of interest in a packaged service is relatively low. Reasons given include:

  - Many terminal users acquire their own terminals and get their computer time and software support from other government agencies.
  - GSA procurement policy might make procurement of such a package difficult. Beginning in January 1977, the government will not be responsive to unsolicited bids or other offerings from vendors.
  - Better deals can be obtained by individually acquiring, via competitive bidding, each of the items separately.
  - There is a high commitment to using the existing in-house computers.

- NASA Ames says they once had a package deal with Tymshare. It represented a problem for them because they keep terminals for 5 years and were required to base the lease rate on a 2-3 year payout. Such a deal is not financially attractive. They remain open to a packaged service idea which is cost-effective.

  - They would not be interested in networking because of the availability of ARPANET and the FCC net which is coming on-line.

- When terminals are changed (some report never changing, merely adding), the period is 4-5 years for timesharing terminals, 6-7 years for RJE terminals.

- Vendors sometimes are, and sometimes are not changed, if and when

terminals are changed. There is no clear pattern.

- Reliability and maintenance are the most important terminal selection criteria. Surprisingly, price is of only moderate interest.
  - NASA Ames ranks most important (5) the need for IBM compatibility and the opportunity for hard copy. This is their only (5) ranked item.

- Except for NASA Ames, interest in local intelligence is low to non-existent. There may be some possible need in the future.
  - NASA Ames would like to edit, format, and do error correction before system entry and graphics capability independent of the CPU.
  - NASA would also like a modular terminal approach which would eliminate the distinction between interactive and remote batch terminals.

- Expectations are that terminal prices will decrease. Opinions, when offered, range from 20-33% in 5 years, unless offset by increased capability.

J. INDUSTRY SECTOR - EDUCATION

- Number of interviews: 5
  - Compton Unified School District
  - University of Illinois
  - University of Missouri
  - New Mexico State University
  - Santa Barbara City Schools

- Of the 5 users contacted by MCAUTO, only 1 (Santa Barbara) uses outside services, in addition to its in-house use.
  - The service is used 12 hours daily in the early part of the month; then, 2 hours daily thereafter.
  - The single application is financially oriented.

- The University of Illinois has the largest number of terminals--nearly 50.
  - All others have less than 50.
  - Most have less than 25.

- Special applications, in-house and outside, include:
  - teaching and training
  - academic projects of professors and students
  - school administration

- Timesharing is the major mode of use with remote batch and inquiry following.

- Terminals either have never been changed or experienced their first change after 3 years.

- Terminal vendors and computer service vendors may or may not be changed when terminals are changed. Respondents were generally unable to answer.
    - Only the University of Illinois clearly indicated that the terminal vendor was changed in 1976 due to maintenance problems.

- Four (4) of the users vest terminal purchasing authority in the EDP department.
    - One (1) in finance

- While there is no objection to acquiring terminals from a services vendor, neither is there any expressed interest.

- Interest in a packaged service is low. Possible application would be financial/administrative. Such a decision would be made at a higher level (e.g., Superintendent of Schools, Superintendent of District).

- Reliability ranks highest as a terminal selection criteria followed by vendor's maintenance capability and references from other users.
    - Vendor maintenance is less important here than in other industries.
    - References are much more important here than in other industries.

- One user (University of Illinois) is going to replace 50 Infoton terminals with Hazeltine due to the inability to maintain Infoton units.

- Local intelligence is of very low interest. Expectations are that in the future some increase in intelligence may be required.

- Trends are acknowledged toward greater use of general purpose intelligent terminals and distributed processing.
  - University of Illinois is 2 to 2 1/2 years away from distributed processing.

K. INDUSTRY SECTOR - CONSTRUCTION, A & E

- Number of interviews:

Very large	2
Large	0
Medium	3
Small	1
Unknown	2
	8

- These firms are small users of terminals. Most have less than 10.

- Five (5) firms use outside services only. The others use both in-house and outside services.

- Outside services are mainly remote batch, followed by timesharing.

- Applications are both financial and engineering-oriented.

- Computer services vendors are:
  - chosen mainly on the basis of their software product offerings and support. Price is not a major selection criteria.
  - changed fairly often (1-2 years) as clients and requirements changed.
  - decided on by the head of data processing or a partner or corporate officer (V.P. or President).

- Reliability is the highest ranked terminal selection criteria, followed closely by vendor's maintenance capability. Price is highly ranked and follows closely.
  - regarding reliability, one user says, "so we stay with IBM."

- Most users do not require local intelligence now.

- Opinions on terminal pricing trends, when expressed, range from decreases to stability to increases.
  - One user comments, "increasing price for more sophistication, but increasing sophistication is not required."

- Other opinions on trends foresee increased intelligence in terminals (including special purpose terminals) and the use of minicomputers in support of, or instead of, terminals.

- Decisions on choice of terminal range widely from the individual user, to committees, to the V.P. Engineering.

- Most users have not changed terminals. Those who have did so after 2-4 years. One was an IBM upgrade, one was too costly to maintain, and 1 was inadequate for the application.

- Neither the terminal vendors nor the computer services vendors were changed when terminals were changed.

- Terminal salesmen are viewed poorly. Comments include:
  - not caring
  - not involved
  - not intelligent
  - not honest

- Services salesmen are seen as generally more customer-oriented and professional.

- Most users do not object to getting terminals from a computer services vendor.

  - The only one who prefers not to is concerned about the services vendor keeping up with the technology and using the terminal to hook his client into processing.

- Interest in a packaged service appears to be low.

  - Most application areas of interest defined are engineering related.

  - One user indicated financial service to be of possible interest.

  - One user reports, "Currently all requirements are met through MCAUTO (basically engineering) except payroll."

L. INDUSTRY SECTOR - SERVICES AND OTHER

- Number of Interviews:

	INPUT	MCAUTO	Total
Services	3	0	3
Other	5	6	11
	8	6	14

- Services interviews include:

  - Confidential - CPA firm
  - Arthur Andersen - CPA firm
  - Skidmore, Owings, Merrill - Architects

- "Other" interviews include:

  - Confidential - hotel chain
  - Holiday Inns, Inc. - hotel chain
  - Warner Brothers - movie studio
  - Johns Mansville - diversified
  - Hoffman LaRoche - drugs and diversified
  - Amin Oil U.S.A.
  - Amin Oil (formerly Burmah Oil & Gas)
  - Dart Industries - diversified
  - Nationwide Financial Services
  - Ralph's Grocery Company - supermarket chain
  - Southern Pacific Transportation Company

- Inasmuch as statistical data is not industry significant in this mixture of interviews, the following will be comments describing any unique observations in individual interviews, which seem of special importance, or which run contrary to other data reported.

- The (confidential) accounting firm has only 3 terminals, although comparable in size to Arthur Andersen, with nearly 150 terminals.
  - Their terminals are all leased.
  - Outside service is nearly all timesharing.
  - Arthur Andersen uses outside services for a full range of tax, audit and budgeting applications.
  - Both do MIS and internal accounting in-house.
  - This profession is covered in great detail in INPUT's recent report, "Computer Services Markets in the Services Industry, Part I" as part of the Market Analysis Service.
  - Arthur Andersen has a low interest in a packaged service. The other's interest is very high.

- The architectural firm has a low interest in a packaged service. They "can't see how we would use it."
  - Architectural applications, performed on an outside service, using 4 terminals in timesharing and remote batch modes, include:
    - specification writing
    - data preparation and verification
    - project management
    - architectural, structural, mechanical design and planning
    - graphics

- There is no requirement for networking.
- Local intelligence requirements are minimal.
- Would like a terminal with CRT, plotter, digitizer, light pen, keyboard, electrostatic hard copy up to 3 x 5 feet.
- Recommends against combining terminal with service.

- The hotel chains are large users of terminals, mainly for reservations. One has over 400 units; Holiday Inn has 2,000.
  - One uses outside service in addition to in-house use. Holiday Inns use inside EDP only. Inside service is mainly inquiry; outside includes timesharing.
  - The outside service used is 50% owned by the hotel corporation.
  - Most terminals are owned.
  - Most terminals are on-line 24 hours.
  - Interest in a packaged service is low.
  - No current need exists for local intelligence.

- Warner Brothers leases 16 terminals which are used for program development, in-house, in a timesharing mode. They are planning soon to lease 100 IBM 3270s for computerized film distribution, order entry, billing and accounts receivable.
  - Their interest in a packaged service is low.
  - No local intelligence is currently required.
  - They don't recommend the motion picture industry as a market for a packaged service.

- Ralph's Grocery currently uses MCAUTO , Tymshare and SBC. They are also developing a system, in a joint venture with IBM, for manufacturing, distribution and general ledger.
    - Their operational philosophy is "stick with IBM single source."
    - No current requirements for local intelligence.
    - *If* they were interested in a packaged service, they would be looking for a financial/accounting system to link their 100 stores, warehouses and manufacturing operations.

- Southern Pacific Transportation Company reports having only 1 terminal, which is used by Engineering, both in-house and outside, in time-sharing and remote batch modes.
    - Local intelligence is paramount.

- Nationwide Financial Services has over 300 terminals, most of which are connected to Action Data Processing, Clayton, Missouri, providing various financial services.
    - Intelligence requirements are high for editing and debugging and will continue to increase.
    - They would not want to get terminal and service from the same vendor. They are presently "stuck" with such a situation and find it unsatisfactory. Flexibility is preferred.
    - They recommend against a computer services vendor attempting a packaged service without flexibility in terminal selection.

- The two Amin Oil interviews reflect a low terminal usage (about 10). They all are used in a remote batch mode with an outside service. Applications are both business and engineering/scientific.
  - Local intelligence is moderately important and increasing.
  - There is no objection to getting terminals from a computer services vendor.
  - Interest in a packaged service is low and cautious.

- The three diversified firms use terminals inside and outside, mainly in timesharing mode. All remote batch work is done in-house.
  - Johns Manville, with 77 terminals in use with GE, SBC, CSC, and NCSS, spends $60,000 per month. Terminals are on-line 3-4 hours per day with the service in use 8 hours per day. This represents a 50% outside use of the terminals with 12 vendors.
  - Hoffman LaRoche, with 265 terminals on-line 4-6 hours per day with the service in use 8 hours per day, spends $10,000 per month. This represents a 10% outside use of the terminals.
  - Interest in a packaged service is "low" or "none."
  - Local intelligence is important and increasing in importance.

M. INDUSTRY SECTOR - DATA BASE USERS

- Number of interviews: 10

- This group of interviews covers several industry sectors and has been slanted toward the data base user(s) in each organization. Organizations and titles of personnel contracted include:

INTERVIEW NUMBER	COMPANY NAME	TITLE OF INTERVIEWEE
161	Kaiser Aluminum	Mgr., Operations Research
162	Manufacturers Hanover Trust	Ass't. V.P. & Economist
163	Wells Fargo Company	Ass't. V.P. & Economist
164	Kaiser/Aetna	Mgr., Systems & Procedures
165	Crocker National	V.P. & Economist
166	Irvine Company	Director, Data Processing
167	Pillsbury	Chief Economist
168	Crown Zellerbach	Corporate Economist
169	ARCO	Corporate Systems T/S Supervisor
170	General Tire	Mgr., Systems & Methods

- All of these firms are users of outside timesharing services for data bases, for:

  - economic analysis and forecasting
  - financial analysis and forecasting
  - management information systems

- Each organization has from 2-10 terminals for these purposes.

- Typically, the service is in use 8 hours per day.
  - 1 user reports 10 hours; 1 reports 18 hours.

- Terminals are on-line to the service, on the average, 2-4 hours per day.
  - 1 user reports 16 hours on-line
  - There is virtually no off-line use.

- Expenditures for the data base related services range from $2,000 to $10,000 per month, averaging $8,000.
  - These expenditures are not strictly for the data base but include timesharing services related to their use.

- Interest in a package service averages low to moderate, a higher expression of interest than in most other industry sectors. Users expressing a moderate interest include:

NAME	APPLICATION DESIRED
Manufacturers Hanover Trust	Economic modeling Financial forecasting
Kaiser/Aetna	MIS systems
Crocker National	Complete fiscal package
ARCO	Long range planning

- Nearly all those who expressed low interest or none indicated a disinterest in acquiring a terminal and computer processing service in a package.

- In half of the interviews, the decision to use a packaged service would be made by the manager of the department or cost center interested in it.

    - In the other half, the decision is more centralized, either with a vice president or a chief economist.
    - Decisions on choice of terminal and computer services vendor tend to be vested in the same people as above.

- Users either change terminals every 2-4 years or have not had them that long.

    - A major upgrade from 15-30 cps was made 3-4 years ago.

- Three (3) of the users report having changed, or plan to change, terminal vendors when terminals are changed.

- None of the users changed, or plan to change, the computer services vendor when changing terminals.

- The major items influencing the choice of service vendors are:

    - software available
    - data bases available
    - cost of service

- Lower cost would be the major reasons for changing a services vendor, and this is rarely, if ever, done.

- Highest ranking criteria for selection of a terminal include:
  - vendor's maintenance capability
  - reliability
  - price

- Current requirements for local intelligence are moderate and seem to be increasing in the future.
  - Intelligence capability is mainly for front end data entry: editing, checking, and ability to interface interactively with available data bases.

- Future trends perceived include:
  - distributed processing
  - terminal portability--terminal on every user's desk
  - more data bases
  - use of minicomputers as terminals
  - use of minicomputers in timesharing networks
  - higher data speeds, going to 9600 b.

- Terminal prices are expected to come down:

	TERMINAL TYPE	% CHANGE 2 YEARS	% CHANGE 5 YEARS
-	CRT	-20%	-40%
-	Teleprinter	-10%	-20%
-	Remote batch	-25%	-50%

- Specific recommendations for the package service vendor include:
  - longer payout period
  - greater cost-effectiveness
  - ease of software conversion from existing systems
  - terminal ability to communicate with other systems
  - service, support, maintenance are crucial.

- Computer services salespeople are seen as being:
  - more knowledgeable about clients' system requirements
  - more knowledgeable about clients' business requirements
  - more problem solution oriented
  - more stable--slower turnover of personnel

IV. TERMINAL MANUFACTURERS

IV TERMINAL MANUFACTURERS

A. INTRODUCTION

- Ten terminal manufacturers with annual revenues ranging from $10 million to $4,500 million were interviewed, and are listed in Exhibit IV-1A. Three are very large, 1 large, 4 medium, 1 small, and 1 undisclosed. Note that companies in the survey that have revenues exceeding $1 million (40%) are conglomerate in nature and have not reported the sales generated specifically from the terminals portion of their business. Corporate payrolls range from 200 to 600,000 employees.

- All companies presently provide, or shall in the near future provide, terminals with some degree of intelligence. The basic product generally consists of a keyboard, visual display, communications capability, and a computational capability. Tape or disk drive memory and printers may be added to the system on an incremental basis.

- Applications include data entry, batch processing, interactive assignments, local data processing, editing, etc.

- New products are reported to be evolutionary rather than revolutionary in nature. More emphasis is being placed upon industry specialization in the formulation of applications software packages, thereby developing a product differentiation thrust through software rather than hardware innovation.

EXHIBIT IV-1A

REVENUES OF TERMINAL MANUFACTURERS

INTERVIEW NUMBER	NAME	ANNUAL REVENUES ($ Million)
301	Burroughs	$1,500
302	Data 100	96
303	Datapoint	72
304	Inforex	52
305	Infoton	-
306	Qantel	10
307	Raytheon	75
308	Sycor	55
309	TRW	2,600
310	Xerox Corp.	4,500

- This product development strategy is a consequence of the fact that hardware costs and prices will continue to decrease as technically superior and more standardized components and elements appear on the market place.

B. IN-HOUSE USE PREDOMINATES

- Manufacturers report that terminal use is primarily in conjunction with in-house installations, as shown in Exhibit IV-1B.

C. SUPPORT FUNCTIONS

- Terminal manufacturers report that they provide training and education to their customer bases in virtually every instance, as shown in Exhibit IV-2. Only 1 (Infoton) does not offer it.

- Software development and network hardware design are the least offered support functions.

- Assistance with applications software development is generally in response to user requests and is infrequent. TRW and Xerox indicate a high level of applications support. The specialized nature of their market requires that they do the software development for their systems installations. TRW specializes in credit terminal systems for retail, banking and supermarkets, while Xerox specializes in manufacturing, wholesale distribution, and government.

EXHIBIT IV-1B

MIX BETWEEN IN-HOUSE AND OUTSIDE SERVICE USE OF TERMINALS SOLD

VENDOR	IN-HOUSE %	OUTSIDE SERVICES %
301	50	50
302	?	?
303	95	5
304	?	?
305	80	20
306	99	1
307	85	15
308	90	10
309	90	10
310	85	15

EXHIBIT IV-2

SUPPORT PROVIDED TO USERS

	NUMBER OF VENDORS PROVIDING, TO	
	MORE THAN HALF OF THEIR USERS	LESS THAN HALF OF THEIR USERS
a. COMMUNICATIONS NETWORK DESIGN	4	5
b. NETWORK HARDWARE (CONTROLLERS)	1	6
c. SOFTWARE DEVELOPMENT	1	8
d. MAINTENANCE	5	4
e. TRAINING/EDUCATION	8	1
f. APPLICATIONS DEVELOPMENT	2	7

Note: Where lines do not total 10, information is not available.

D. DISTRIBUTED PROCESSING WILL EXPAND TERMINAL SALES

- Manufacturers are vague on details and timing of the impact of distributed processing. Samples of the generalized responses are:
  - "Positive impact--business will increase"
  - "Constant improvement"
  - "More hardware will be sold"
  - "Should help promote sale of hardware"
  - "More intelligence in customer office and more sales".

- Only 1 interviewee would venture a guess as to the timing of the impact peak: 1981.

E. IBM REMAINS THE LEADER

- IBM will retain its leadership role in the industry through both technological development and pricing (sale and lease) strategy. It is critical that they protect their large C.P.U. rental base. Therefore, they will likely design their local decentralized processing systems so that the programs can only be supplied by the host computer.

- IBM is aggressively entering the basic minicomputer market ("PEACHTREE") and is expected to energetically attack the terminal market. Nevertheless, the size and growth of the marketplace will permit the well-financed and astute independents to continue to be an important factor.

- Micro and minicomputers on a chip will continue to drive hardware costs down, and ultimately a "calculator" type product with peripheral options will evolve.

- The IBM pricing strategy will be such as to maintain their traditional factory margins, which will provide some price umbrella for the industry.

- Manufacturers will remain sensitive to IBM actions. IBM will retain their historic role as the industry pattern setter. IBM's current thrust into office automation and word processing systems will "validate" those markets for others.

F. OTHER MANUFACTURERS FOLLOW

- No major technological breakthroughs are expected from other manufacturers.

- Large mainframe producers will place additional emphasis on the terminal marketplace, as will the minicomputer companies.

- No one company will dominate the industry. In 3 to 5 years the national economy and the proliferation of terminal producers will create a shakeout, resulting in mergers and consolidations of some of the weaker and smaller members of the industry.

G. COMPUTUER SERVICES VENDORS URGED NOT TO MANUFACTURE TERMINALS

- The concept of a computer services company verticalizing their

product offering to their traditional customer base by installing, leasing, and maintaining their own terminals is logical.

- Interviewees all believe that the potential market for such a packaged product and service is both large and growing. However, they believe it is preferable for the services vendor to OEM purchase rather than manufacture the hardware, to protect against cost/price margin squeezes, and to enable a broader line of terminals to be offered.

- This arrangement is being approached by the banking services industry with their electronic funds transfer concept.

- A joint venture between a terminal manufacturer and a computer services vendor would be of interest if structured favorably. Individual comments were not very meaningful, nor were there any imaginative elements introduced during discussions.

- Companies specifically expressing a potential interest in a joint venture include:
    - Burroughs
    - Data 100
    - Raytheon
    - Infoton

- An unsolicited phone call from an INPUT client, Hazeltine, indicates their active interest in a joint venture.

H. TERMINAL PRODUCT CHARACTERISTICS

- Manufacturers all agreed that there will "always" be a market for special purpose terminals for specific applications, because they can be produced more cheaply than a general purpose unit.

- Special purpose terminals need only be partially intelligent, utilizing a read-only memory (ROM), as compared with a more intelligent microcomputer-controlled terminal. The consensus of opinion is that all terminals will eventually be intelligent.

- Specialization results from special environmental, as well as special applications needs. Ruggidized units are sold to the military, transportation, some manufacturing and other markets where operations are being conducted in environments that are more demanding upon the product than those existing in the office or laboratory locations.

- No dramatic technological breakthrough is expected during the next ten years.

- Reduction of microcomputer manufacturing costs, improvement of image quality on visual displays, size and cost of memory, and the utilization of charge coupled devices (CCD) for random access memory resident within the terminal, will all contribute to a constant gradual improvement of the industry's product price performance ratio.

- Vendors will offer systems which provide more functional capability for a constant price, or reductions for constant performance capability.

- Vendors generally declined to give, or said they did not have, information about lease recovery periods, turnover, etc. A tabulation of their responses is given in Exhibit IV-3 . The only clear conclusion is that terminal life expectancy is about 7 years.

I. TERMINAL PRICES WILL BE DOWN 15-20% IN 5 YEARS

- Respondents generally were unwilling/unable to provide useful information on end-user pricing trends. As a result, INPUT conducted three specific interviews for the sole purpose of investigating price trends. These 3 additional interviews were with:
  - Teletype Corporation
  - TRW, Inc.
  - Qantel

- The terminals under consideration during these interviews were:
  - a self-contained alpha-numeric display (CRT) with keyboard, both programmable and non-programmable;
  - a self-contained printing terminal with keyboard, both programmable and non-programmable;
  - a remote batch terminal.

- All agree that price trends in both 2 and 5 years will be down, as shown in Exhibit IV-4.

- The 2 and 5 year price trend of terminals is not affected by whether or not the unit is programmable.

EXHIBIT IV-3

RESPONSES TO MANUFACTURER'S QUESTIONNAIRE, ITEM # 19

	RESPONDENT #									
	301	302	303	304	305	306	307	308	309	310
a. How long does a terminal have to be on lease for you to recover the equivalent profits of an outside sale? ______ (months)	D	D	DK	20	NL	NL	16-20	D	D	DK
b. Typically, how long is the average terminal in use before it is turned over? ______ (months)	D	30	84	DK	NL	NL	DK	D	UP TO 60	DK
c. Typically, how long is a terminal out of service during each turnover? ______ (months)	D	3	1	D	NL	NL	D	D	D	1/2
d. What is the average life of a typical terminal? ______ (years)	7	7-10	DK	7	DK	DK	8	D	6	5-7
e. How would you expect that (d) to change in the future? ______ (years)	NC	NC	DK	DK	DK	DK	10	D	NC	BETTER

D = Decline to comment
DK = Don't know
NC = No change
NL = Not leasing

EXHIBIT IV-4

END USER PRICE AS A PERCENTAGE OF THAT CHARGED IN 1976

Terminal Type	In 1978	In 1981
Alphanumeric display w/keyboard	85%	80%
Printing with keyboard	95%	85%
Remote batch	90%	85%

- The display terminal, having a larger percentage of manufacturing cost represented by electronic versus electromechanical elements, will tend to decline in end user price at a faster rate than the printing terminal. The reduction in cost of manufacturing will be offset, to a degree, by an increase in sales, administrative and product development expenses.

- An ink jet or other less expensive non-impact printing unit replacing an impact printer would tend to reduce printing terminal prices at a faster rate.

- An eventual reduction in the number of terminal manufacturers, through merger and consolidation, will tend to offer greater volume for fewer manufacturers. This will be another factor supporting the price reduction through increased volume.

- More special purpose terminals may emerge, if volume permits adequately competitive pricing, e.g., printing terminals with non-impact "scratch pad" printing capability.

- One company, strongly tooling oriented, with substantial volume, could create a price break in the printing terminal market.

J. CHARACTERISTICS OF SALES PERSONNEL

- The "typical" computer terminal sales person is a college educated 32 year old, who will attain an annual quota of $800,000 for a total compensation of $32,000. Summary data is tabulated in Exhibit IV-5 .

- There is an increasing interest in MBA graduates to be recruited for the sales operation, because of the increased involvement by the manufacturer in the day-to-day business concerns of his clients.

- Smaller companies try to hire more experienced people who can "hit the ground running," and thereby reduce the time required for new employee training.

- All companies provide at least one week of formal training and continuous product upgrading for their field sales force.

- It is not important that the field salesperson specifically have prior experience selling terminals; however, it is desirable that they have at least 5 years experience in the sales of computers, software, applications, systems or service bureau products.

- Most manufacturers express strongly the need for their sales personnel to be industry applications oriented, mainly because of the increasing tendency toward system sales.

EXHIBIT IV-5

SALESPERSON PROFILE

	RESPONDENTS
1. DESIRED AGE:	
25-35 years	7
Not of consequence	3
2. EDUCATION:	
Bachelors Degree (minimum)	8
Not of consequence	2
3. ANNUAL QUOTA (AS SOLD):	
$350-$500 thousand	2
$501-$1,000 thousand	5
Over $1,000 thousand	2
No reply	1
4. AVERAGE ANNUAL TOTAL COMPENSATION:	
Less than $25 thousand	1
$25 to $30 thousand	3
$31 to $35 thousand	2
Over $35 thousand	2
No reply	2

- Only 2 respondents believe that industry applications are not important:
  - Inforex: "Not applicable to product"
  - Raytheon: (Mainly sell airline reservations terminals)

- Over 70% of respondents require their sales people to have the ability to both define a software requirement and to design a system using their terminals, as shown in Exhibit IV-6.

EXHIBIT IV-6

SALESMAN'S TECHNICAL CAPABILITY REQUIREMENTS

MANUFACTURER #	DEFINE A SOFTWARE REQUIREMENT	DESIGN A TERMINAL SYSTEM
301	Yes	Yes
302	Yes	Yes
303	Yes	Yes
304	Yes	Yes
305 (OEM only)	No	No
306	Yes	Yes
307	Yes	Yes
308	Yes	No
309*	No	Yes
310	Yes	No

*(NO SOFTWARE REQUIREMENT)

V. LEASING

V LEASING

- The following information derives from an interview with U.S. Leasing.

- If the terminal manufacturer desires to share the risks and cash flow requirements when offering operating lease programs, an organization such as U.S. Leasing is an eager and knowledgeable potential partner who has extensive experience in this industry. An infinite combination of programs can be negotiated with such organizations, dependent upon the manufacturer's desires or requirements.

- Most substantial manufacturers in the terminal industry elect to carry the lease paper themselves and not share the residual opportunities with leasing organizations.

- Manufacturers of intelligent terminals must offer a comprehensive operating lease program to their end user customer base. Such a program should consist of 12, 24 and 36 month irrevocable operating leases and 60 month full payout leases.

- 12 and 24 month operating leases, if held by the manufacturer, maximize cash outflow and minimize reported revenues and net income, in the short term. However, the ultimate residual benefits can be substantial. By comparison, financial leases and outright sales have the advantage of maximizing P&L impacts for both revenue and net income as well as for net cash inflow.

    - A commercial bank will provide, in front end cash, the

irrevocable portion of an operating lease, at one to three points over the prime rate, allowing the manufacturer to retain ownership of the equipment and enjoy all of the future residual benefits.

- U.S. Leasing expects that the terminal market will grow 30-35% per year.

- U.S. Leasing acknowledges the presence of IBM as an important but not increasingly dominant factor in the terminal market.

- U.S. Leasing currently handles operating (full payout) leases of Computer Devices, Hazeltine and Inforex.

VI. THIRD PARTY MAINTENANCE

VI THIRD PARTY MAINTENANCE

- The following information derives from an interview with the Maintenance Division of TRW Computer Services Division.

- TRW made their commitment to be in 3rd party maintenance when they took over the Singer/Friden responsibilities. TRW maintenance has 180 offices and 2500 people involved in U.S. operations and offers 3 shift service. Some 70,000 terminals are currently their responsibility. They are planning to offer maintenance service as a business, basing maintenance fees on a % of lease cost.

- No comment was available on the idea of a computer services vendor manufacturing and installing their own terminals.

- An OEM buyer of terminals can select from the following alternatives:
  - maintain all product themselves
  - utilize a third party maintenance arm (i.e., TRW, Sorbus, Raytheon, etc)
  - subcontract the field maintenance responsibility to the OEM supplier or manufacturer of the hardware.

- Best control and maximized profits exist when volume and product density are sufficient to support an in-house national field maintenance capability. Until that point is reached, it is most logical to employ the services of a third party maintenance organization.

- Responsible third party maintenance organizations, servicing terminal hardware, will:
  - have good manpower density throughout the U.S.
  - review equipment and establish a parts inventory
  - develop a proposal for parts inventory and maintenance costs, upon which a field maintenance plan can be based.

VII. INFORMATION SERVICES VENDORS

VII INFORMATION SERVICES VENDORS

A. SUMMARY

- The price of intelligent terminals will go down in 5 years, but the price will be somewhat offset by an increase in capability.

- The price of an intelligent terminal will be limited by the cost of the electromechanical devices.

- Most timesharing vendors do not offer terminals with their services. Those that do, usually offer a highly specialized applications service, of which the terminal is a facilitating part. In the case of Quotron, they are a hardware vendor themselves (Scantlin Electronics). In the case of Management Horizon Data Systems, their customers have their hardware, because they offer automated distribution systems as a total package.

- The networking capability appears to be a major feature of timesharing vendors' services and promises to be even more so in the future. The need for increased transmission rates, in a reliable manner, up to 4800 bps and beyond (10 years), appears necessary. The transfer of user data bases across the net should be considered. That is, the net could be transparent, user to user, or timesharing vendor to user.

- With the exception of CSC, the timesharing vendor is chosen because he offers specialized software, expertise, and sometimes data bases in selected industry areas and applications areas.

- Those vendors offering a total specialized service may use distributed computing as part of their network capability. They are not overly concerned as to its impact on them, because they have a favored position (technical/price/performance) in their market areas of interest.

- The timesharing vendors offering more general timesharing services seem very concerned about minis and the impact of distributed computing. They all know that they must provide for distributed computing through intelligent terminals. How to do it in a cost-effective manner is their problem.

- No one seems to have a good handle on IBM's plans. Some of the vendors are in such highly specialized areas that they are not overly concerned about what IBM is doing. Their prime interest seems to be to provide for IBM capability.

- With the exception of CSC, which is taking the full computer utility route, the vendors are specializing in specific industries and specific applications.

- Most vendors are changing the structure of their marketing organization such that they have expertise in an applications area, know data communications and can sell applications-oriented products. The orientation seems to be more MBA-like, a consulting role.

- The compensation packages are shifting away from a small base and high commissions to a relatively higher salary structure plus a lower commission ratio. A greater overall package results in line with the higher quality personnel required.

- Virtually all vendors think that in the future all terminals will be intelligent.

B. INDUSTRY PROFILE

- Exhibits VII-1&2 show the distribution of sources of revenue, by mode of computer service, for the 10 vendors interviewed.

- The vendors can be classified into three broad categories, as shown in columns 2, 3, and 4, of Exhibit VII-3.
  - Those vendors who are offering a complete and specialized industry and applications specific service - 3 in this category.
  - Those vendors who are primarily offering system applications in selected industries and applications areas - 5 in this category.
  - Those who had established themselves as total computer utilities - 2 in this category.

C. INFORMATION SERVICES

- The vendors are heading in one of two opposite directions regarding specialization:
  - The majority are shifting to applications-orientation and to industry applications packages.
    - Financial market transactions information (e.g., stocks, bonds, commodities, money)
    - Distribution systems (e.g., automotive, consumer products)
    - Financial transaction services (e.g., trust accounting, security clearing)

EXHIBIT VII-1

REVENUES OF INFORMATION SERVICES VENDORS

INTERVIEW NUMBER	NAME	TOTAL REVENUES ($ Million)	INFORMATION SERVICES REVENUES ($ Million)
201	Quotron Systems	-	4.3
202	Automatic Data Processing	154.7	154.7
203	Management Horizon Data Systems	2.0	2.0
204	Bradford National Computer Services, Inc.	67.4	-
205	Confidential	-	-
206	Rapidata	14.8	14.8
207	Computer Sciences Corporation	219.9	48.5
208	Comshare	12.3	12.3
209	Confidential	-	-
210	Confidential	-	-

EXHIBIT VII-2

INFORMATION SERVICES DISTRIBUTION

VENDOR NO.	DISTRIBUTED COMPUTER SERVICE (%)			
	TIMESHARING	REMOTE BATCH	BATCH	INQUIRY
1	0%	50%	25%	25%
2	85	10	5	0
3	60	40	0	0
4	20	78	0	2
5	94	3	2	1
6	85	10	5	0
7	0	50	50	0
8	75	5	0	20
9	75	20	0	5
10	0	10	0	90
AVERAGE	49%	28%	9%	14%

Note: The vendor numbers do not necessarily correspond to the interview numbers in the previous table, in order to protect the proprietary nature of the data given.

EXHIBIT VII-3

INFORMATION SERVICES VENDOR PROFILE

VENDOR NO.	INDUSTRY SPECIFIC	APPLICATIONS ORIENTED	COMPUTER UTILITY	GENERAL TIMESHARING	OFFERS/ INTENDS TO OFFER TERMINALS	COMMUNICATION NET	
						NATIONAL	INTER-NATIONAL
1	X				X	X	
2	X					X	
3	X					X	
4			X	X	X	X	X
5			X		X	X	
6		X		X		X	
7		X		X		X	
8		X			X	X	X
9		X		X	X	X	X
10		X		X	X	X	X

The vendor numbers in Exhibits 2 through 4 is meant to represent any of the information services vendors responding to this market analysis, in order to protect the confidentiality of the information provided during interviews.

    - Financial and product forecasting (e.g., data bases, proprietary software)
    - Management and financial information systems (e.g., data management software, analysis software, proprietary MIS systems software)
    - Telephone service systems
    - Banking services (e.g., demand deposit accounting, S/L accounting)
    - Human resources reporting and management (e.g., payroll and personnel)

- Others are committed to being total service computer utilities
  - Requirements
    - Sophisticated communications net
    - Facilities management
    - Communications engineering
    - Software services
    - Multiple programming languages
    - Large regionnal data centers
    - Consulting role
    - National contracts - bulk discounts
    - Capital incentive
  - Users
    - Large companies
    - Multiple sites

  - Industries
    - Federal Government
    - Life Insurance
    - Health Insurance
    - Banks
    - Retail

- Many of the information service vendors offer or intend to offer terminals and other equipment as part of their service (see column 6, Exhibit VII-3).
  - There was one (1) industry specific vendor in this category. The equipment was an integral part of the service.
  - There were three (3) applications-oriented vendors in this category. Two (2) of these vendors were offering or intended to offer the equipment for processing in a distributed manner.
  - Both computer utility vendors offer equipment in conjunction with their services. One (1) computer utility vendor offered the equipment as an integral part of its service.

- The vendors felt that interactive timesharing is still the dominaNt~~e~~ mode of offering information services.
  - Some vendors felt that the use of deferred timesharing and remote batch is increasing. Several vendors felt that in 2-3 years the use of remote batch services will reach 40% of the total processing load.

- The number of information service vendors offering general interactive timesharing appears to be decreasing.
  - There were four (4) of the applications-oriented vendors offering this service.
  - There was one (1) of the computer utility vendors which offered this service.

D. COMMUNICATION NETWORKS

- Item of general agreement is that 9600 bit/sec. data transmission is imminent.

- All vendors interviewed provide national networking, and some offer international service, as shown in Exhibit VII-3.(p. 107)
  - There are three (3) applications-oriented vendors offering access to the common market via transatlantic cable or communications satellites.
  - There is one (1) computer utility vendor who offers access to the Common Market via communications satellites.

- Vendor 1
  - a national and international network on leased line and transatlantic cables
  - have net controlled by communications minicomputers
  - are able to handle 2400 bit transmissions
  - believe will be on 4800 bit nationwide in a year
  - believe will be able to handle 9600 bit in near future

- Vendor 2
  - a national and Canadian network on leased line
  - utilizes communications processors which can handle 15 b to 9600 b

- 1200 b regional
- 4800 b service in New York City
- 9600 b between computers

- believe 9600 b will become widely available through proprietary communications systems.

- Vendor 3

  - have own proprietary network for U.S. and Canada
  - have international net to Common Market ~~via cable and~~ e via cable and satellite
  - use 80 communications processors for packet switching on leased line
  - offer 2400 b service now on national net
  - offer 9600 b on local basis
  - going to 4800 b standard soon to support terminal operation.

- Vendor 4

  - have a national and Canadian network via leased lines
  - have 2400 b on national net
  - believe net will go to 9.600 b within 2 years
  - would support private communications net like ~~"DATRON"~~ DATRAN

- Vendor 5

  - have regional nets in 6 major cities tied into national net at large national data centers
  - are a remote batch oriented operator without timesharing

- are on 1200 b system now
- upgrading to 4800 through communications processors.

- Vendor 6
  - have proprietary national and Canadian net on leased lines
  - have net to Common Market via transatlantic cable
  - have communications processor to control net for bisync transmissions
  - expect to upgrade to 4800 b national soon

- Vendor 7
  - have national and Canadian network on leased line
  - satellite approach at six regions for traffic concentration to national data center
  - are on 1200 b reliability
  - expect to go to 2400 b very soon
  - believe 9600 b will come about in near future

- Vendor 8
  - have comprehensive proprietary national and Canadian net
  - have international net to Common Market via satellite
    - 140,000 mile network
    - 125 cities
  - use communications microprocessors to control and balance net.

- Vendor 9
  - have proprietary national and Canadian net by leased lines
  - have international net to Common Market via satellite and cable
    - 180,000 miles of line
    - 175 nodes
    - 38 processors on line
    - communications processors for market transmissions of 4800 b - 9600 b

- Vendor 10
  - have own national net to ~~our~~ four national data centers
  - are operating on a 4800 b standard
  - are going to 9600 b locally on communications processors

to go to national centers

E. PROFILE OF A TYPICAL INFORMATION SERVICES SALESPERSON

- Exhibit VII-4 describes the average qualifications and expectations of sales personnel in each of the interviewed vendor's organizations.

- The average age of the marketing sales personnel ranged from 28 to 38.
  - There were no distinguishable differences between the applications-oriented vendors and the computer utility vendors.

- The educational level of the marketing sales force was high.
  - All were college graduates
  - Between 25 and 50% held advanced degrees, primarily MBAs
  - The service vendors felt that the number of sales personnel holding advanced degrees (MBAs) was increasing and was due to the increasing complexity of business operations.

- The years of prior experience varies from 2 to 10 years.
  - Until the last few years, the vendors obtained their marketing sales personnel primarily from:
    - IBM
    - SBC
    - The mainframe manufacturers
  - Several vendors report that they are recruiting MBAs chiefly from universities and are instituting a comprehensive "in-house" training program.

EXHIBIT VII-4

PROFILE OF AVERAGE SALESPERSON

VENDOR NO.	AGE	EDUCATION (%MBA)	EXPERIENCE SELLING SERVICES (YEARS)	PRIOR EXPERIENCE (YEARS)	AVERAGE ANNUAL SALES	AVERAGE ANNUAL BASE SALARY	AVERAGE ANNUAL COMMISSIONS	OTHER INCENTIVES	TOTAL ANNUAL COMPENSATION
1	38	0	9	5	$700	$18	$ 9	$ n/a	$27
2	29	50	4	4	120 highly variable	14	8	n/a	22
3	35	50	4	10		28	7	n/a	35
4	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a
5	28	25	5	2	600	11	16	1	28
6	32	40	4	6	150	18	9	3	30
7	30	25	2	6	n/a	17	11	n/a	28
8	29	33	2	4	90	14	8	n/a	22
9	28	40	2	4	100	13	12	n/a	25
10	34	50	6	6	1,000	26	10	n/a	36
AVERAGE	31	37%	4	5	$ 400	$18	$ 9	$1	$28

($000)

- The average annual base salary varies between $11 thousand and $28 thousand.
  - The base salary appeared most correlated to age.
  - The base salary also appeared correlated to advanced degrees.
  - There did not appear to be base salary trends between vendor categories.

- The average commission ranged from $7 thousand to $12 thousand.
  - The commission range varied from 25% of base to 150% of base
    - Most plans appeared to be in the 50% of base range.
    - There did not appear to be an average pattern trend among vendors who declined to divulge specific commission formulas.
  - Some vendors expressed the need to shift to higher salaries and lower commissions in order to attract more qualified MBAs and technical people into sales.

- There did not appear to be "other incentives" in the compensation structure.
  - Several vendors offered bonuses for new customers or profit sharing above total sales targets.

- The total compensation for vendor marketing sales personnel ranged from $22 thousand to $36 thousand.
  - The total compensation appeared correlated to age.
  - There did not appear to be a total compensation trend between vendor categories.

- The average annual sales targets ranged from $100 thousand to $1 million in new revenue.
  - The vendors were not willing to release the commission formulas.
  - Several of the commission plans were based on an "amortized" revenue plan whereby both past and new revenues were included.
    - The method includes some downside risk on base salary.
    - The method offers somewhat less in commission for new business.
  - There did not appear to be sales target trends between vendor categories; and the annual sales/annual compensation ratios varied widely, averaging about 5 to 1.

F. VENDORS' PERCEPTIONS OF THE IMPACT OF DISTRIBUTED COMPUTING

- Distributed computing will increase the market for information services overall, but will cause a reduction in interactive scientific and smaller MIS applications.

- Distributed computing will:
  - support the trend toward application specific orientation
  - take some workload off timesharing nets
  - enable the development of more sophisticated and comprehensive systems.

- Intelligent terminals and networked minicomputers will allow vendors to get to smaller users of applicational services.

- The advent of distributed computing will allow vendors to reach outside of larger metropolitan areas and extend ~~m~~Nodes of their communications net to smaller population centers.

- The use of intelligent terminals in information processing networks will put a premium on software.

- Most vendors felt that the peak of the distributed computing impact would occur within 2-3 years.

- Several vendors are actively planning to incorporate intelligent terminals into their communications nets and offer them to users as part of an industry application package.

- Those vendors offering specialized industry applications felt that distributed computing would enable them to extend their service to the places where the basic transactions occur and to capture data and process those transactions as they occur.

- Vendors expect that the expansion of communications capabilities resulting from the spread of distributed computing will put a terminal on every user's desk or enable him to carry one around wherever he goes.

G. VENDORS'PERCEPTIONS OF FUTURE TRENDS

- Communications speeds
  - 1200 b reliable now on voice grade
  - 4800 b available now on proprietary networks
  - 4800 b to come on voice grade with bisync operations
  - 9600 b available locally for a premium
  - 9600 b will be widely available by market switching in the near future on both common carriers and proprietary systems.

- Communications costs
  - Bell System's proposed shift to message unit charges for time on local basis could add $100 per month to each user's dial-up costs, accelerating the need for high speed transmissions via intelligent terminals.

- Terminal speeds
  - Most new terminals contain a microprocessor, put there initially to increase reliability, but which can be used for communications protocols and buffering.
  - On input end 1200 bs useful for most applications
  - holdup is at output due to teleprinter limitations
  - intelligent terminals will use up to 4800 b effectively

- Terminal prices
  - As shown in Exhibit VII-5, everyone expects a continuing decrease in terminal prices during the coming 5 years, even though terminal capability (intelligence) will be increasing.
  - CRT terminals will be down 10-20% in 2 years and 20-30% in 5 years.
  - Remote batch terminals will have the fastest price decrease (56% in 5 years) because of competition from intelligent terminals which will be able to perform remote batch functions at reduced cost.
  - Teleprinter prices will reduce most slowly (17% in 5 years) because of limitations imposed by the mechanical elements.
  - Many vendors feel that there will be a proliferation of intelligent terminals and vendors resulting in a price cutting and significant business consolidations and failures.

EXHIBIT VII-5

TERMINAL PRICE TRENDS

(as forecast by Information Services Vendors)

VENDOR #	2 YEAR TRENDS-PRICE REDUCTION (%)				5 YEAR TRENDS - PRICE REDUCTION (%)			
	CRT	THERMAL	HARD COPY	REMOTE BATCH	CRT	THERMAL	HARD COPY	REMOTE BATCH
1	-20	-	-10	-	-33	-	-20	-
2	- 5	-	-15	-20	-10	-	-25	-50
3	-	-	-	-15	-	-	-	-50
4	-20	-	-	-40	-30	-	-	-60
5	-	-	-	-	-	-	-	-
6	-10	-15	-10	-40	-20	-25	-15	-75
7	-20	-	-15	-20	-30	-	-20	-50
8	-15	-	- 5	-25	-30	-	-10	-60
9	-20	-40	-10	-25	-30	-1	-20	-60
10	-20	-	- 5	-20	-30	-	-10	-40
	-16%	-	-10%	-26%	-27%	-	-17%	-56%

- Applications
  - The trend is toward industry specific and application specific services.
  - Word processing systems integrated with data bases and report preparation represents a strong and emerging marketplace.

H. VENDORS' OPINIONS ON IBM's INFORMATION SERVICES PLANS

- IBM will re-enter the information services marketplace once their agreement with CDC expires in 1978.
  - They will not offer services like they did with S.B.C. but will concentrate on providing network and communications services for interconnection of minicomputers, as well as large mainframes.

- Vendors are carefully watching the IBM/Comsat joint venture to develop high speed communications between large systems using satellites and roof top antennae.

- Most vendors are uneasy with the IBM STLC/SNP protocol design believing that IBM may again be heading toward a "non-standard" standard.

- Some vendors feel IBM will tie large processors together with a programmable microcommunications processor and implement distributed computing with terminals having microprocessor STLC/SNP interfaces.

- Some vendors feel IBM is combining voice and data communications functions under the mantle of "SECURE" communications.
  - "The only way you can be sure you are SECURE is with IBM"

  - IBM is using the Common Market as a test bed.

- IBM is going in the direction of application specific terminals
  - point of sale (Sears Roebuck)
  - EFTS
  - production control

- The more specialized vendors do not feel threatened by possible IBM plans to re-enter the information services marketplace.
  - Vendors are carving individual niches in the marketplace which they don't feel will warrant IBM's attention (highly specialized applications and data bases)
  - Vendors have in depth expertise in selected areas and a captured market, because:
    - they are cost/effective
    - they have a strong following
    - entry of competitors is difficult.
  - IBM is primarily a mainframe vendor and has never entered the total systems services market place.
  - Most vendors just want to stay IBM compatible.

- A few vendors believe that IBM will continue to push stand alone single application systems in the low end of the market place, provide

them with STLC/SNP interface capability, and tie them together later with a proprietary network capability.

- Many vendors feel IBM 5100 is an Office Product's stepchild and is not a part of concentrated effort to network minis.

- One vendor is researching a recent "Newsweek" report that IBM will voluntarily split into three companies.